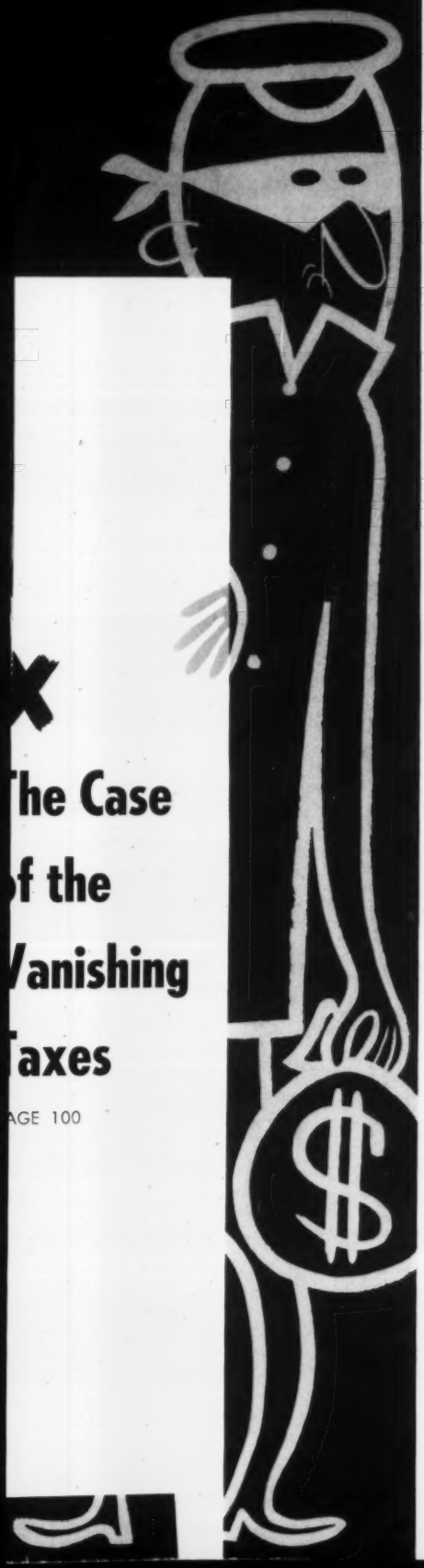
MAY 11, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



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Companies, Union Far Apart as Steel Pact Negotiations Begin

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Why 14,964 Firms Failed in '58

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How to Stop Productivity Killers

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Lathe Can Advance with Technology

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Throwaway Cutters Save $15,596 A Year at Westinghouse Division

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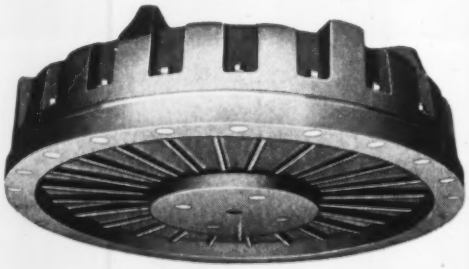
2 New Bolted LIFTING MAGNETS by EC&M

57" AND 66" DIAMETERS



New throughout, these EC&M **Type SB Lifting Magnets** have many improvements over previous-design bolted magnets. They are mechanically stronger, have improved coil construction, and high lifting capacity due to a better magnetic path. Tapered-head, through bolts simplify field replacement of worn pole shoes...permit quick access to coil.

Strap aluminum coil winding is firmly anchored by top-plate held by bolts and screws. Continuous welds seal coil spool in magnet case and make it water-tight. Welds are easily ground or chipped off for field removal of coil.

Coil-leads terminate in separate chambers, 180° apart. The magnet is freed of moisture and completely filled, through these two chambers, with self-polymerizing, insulating compound.

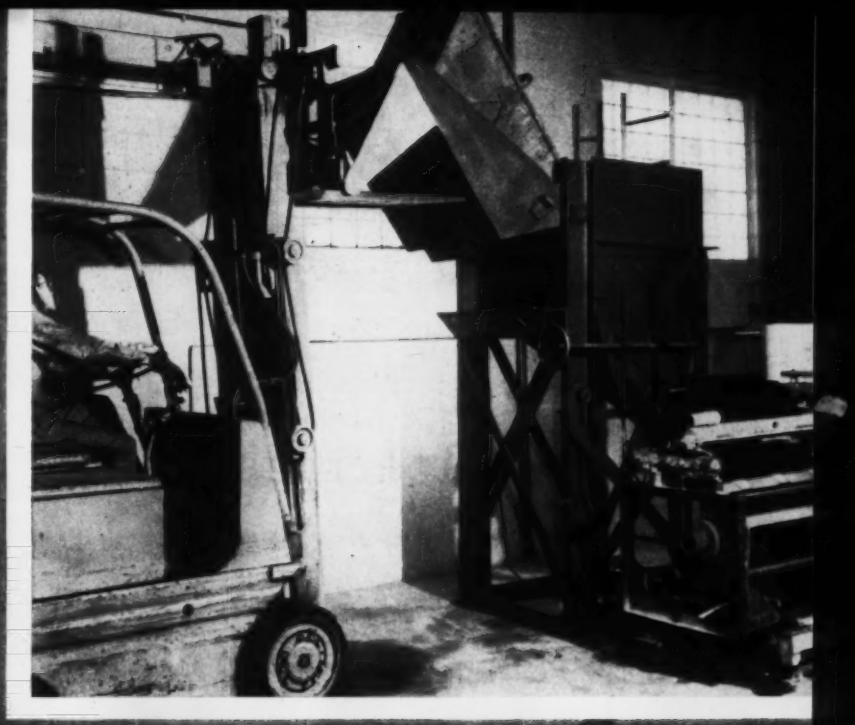
Chains, the same as used on large EC&M ALL-WELDED Magnets, are of 3-leg design with links of cast manganese steel terminating in a forged crane link for easy hook-on.

EC&M BOLTED MAGNETS complement the complete line of EC&M ALL-WELDED Magnets • For all the facts, Write for Bulletin 1300 SB

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

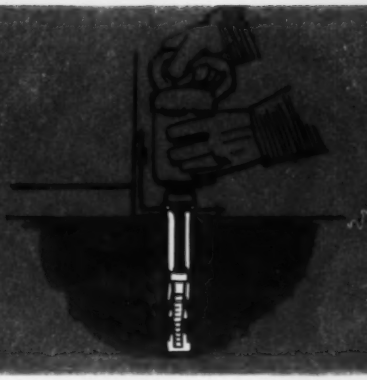
9251

Shown above is a Bethlehem Square Head Anchor Bolt, with malleable-iron shell, forged-steel plug, and hardened washer.



Determine position of machine; mark holes on floor; drill holes in machine legs to required diameter; drill holes in floor to required diameter and depth.

Move machine into position; insert assembly through hole in machine leg into the hole drilled in the concrete floor.



Tighten bolt head with power wrench. This draws up the plug, expanding the serrated leaves of the shell. Machine is locked tightly to the concrete base.

Special bolts that anchor machinery

When the forklift truck dumps its load, that hopper bin really vibrates. Keeping it anchored firmly in place used to be quite a problem.

Then Bethlehem fasteners engineers were called in. They recommended using a special-headed anchor bolt with an expansion shell to anchor the hoppers. As shown in the drawings above, this bolt *locks* machinery to base concrete. Today, these hopper bins are firmly anchored, undisturbed by the drastic vibration.

Our fasteners engineers are often able to find a solution that adds up to a saving for the user. If you'd like their help, just get in touch with our nearest sales office.

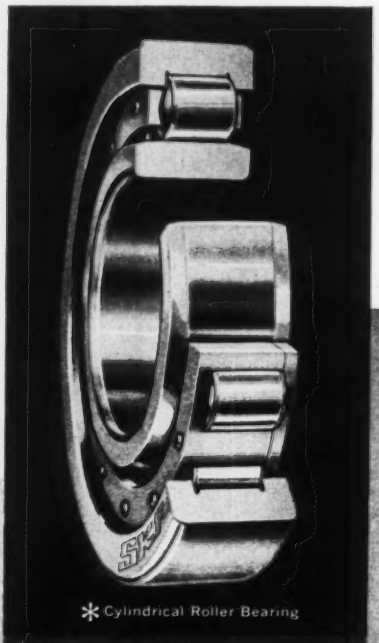
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

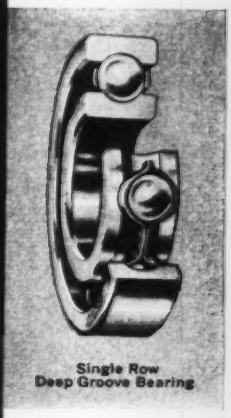
BETHLEHEM STEEL

BETHLEHEM STEEL

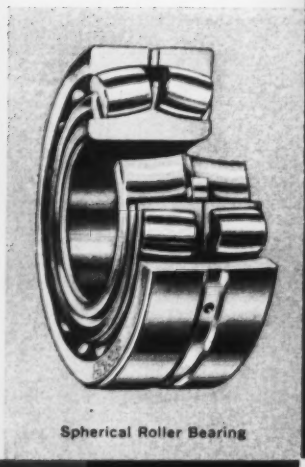
What's "special" about these standard SKF bearings?



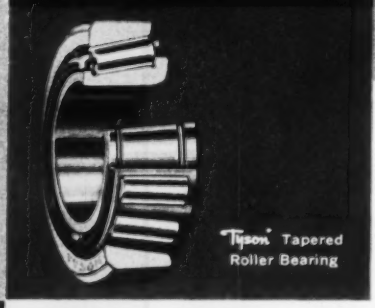
*Cylindrical Roller Bearing



Single Row Deep Groove Bearing



Spherical Roller Bearing



Tyson® Tapered Roller Bearing

Spherical Roller Thrust Bearing

Angular Contact Bearing

SEE THEM AT THE
DESIGN ENGINEERING SHOW
MAY 25-26
SKF BOOTH #618

They all have exclusive features. Where else, for example, can you get the 33⅓% higher capacity available in standard SKF spherical roller bearings?

*Or, take the cylindrical roller bearing. This type provides high radial capacity and minimum shaft friction. Controlled shaft end float within the bearing is a natural advantage of this design.

Yet this is SKF's standard cylindrical roller bearing, promptly available in 154 sizes ranging from just under 1" to 6" (bore). In the double row it's 1" to 9.5".

Why not get the complete facts on these "special" but standard (and economical) bearings? For details, call any of the 25 SKF sales offices today. 5923

Spherical, Cylindrical, Ball, and Tyson® *Tapered Roller Bearings*

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

®REG. U. S. PAT. OFF.

WHO FORGES THE TOUGH ONES?...
and precision-machines them, too?

When the forgings come as tough as this motor housing, the customers come to National Forge. On this job (for a chemical manufacturer), we had to forge and precision-machine to extremely close dimensional tolerances (+.0020″, −.0002″ including run-out).

National Forge handled the complete production—from melting AISI E43-40 steel, to forging, to hollow boring, to finish-machining—in our integrated "one-source" plant.

You say *your* forging specs are tough? Call National Forge, the company with over 40 years' experience in forging and precision-machining the tough ones.

NF *NATIONAL FORGE COMPANY*

IRVINE, WARREN COUNTY, PENNSYLVANIA

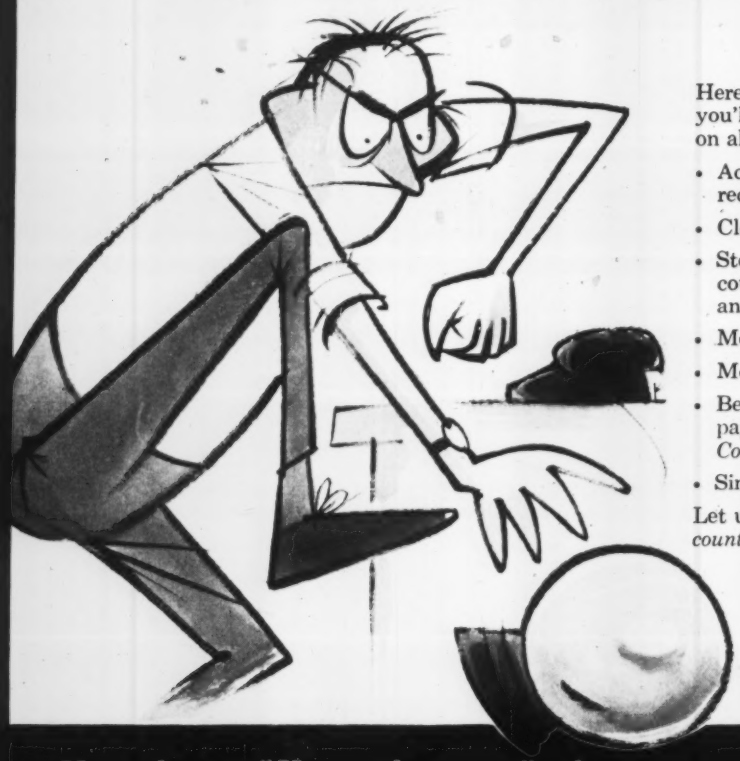
NF-59-02

For more information on "the tough ones," and the machinery that makes them "best"—write for bulletin NFO

"No More Crystal Ball!

Now we're in business with

FACTS-IN-FIGURES"



Here are some of the chief advantages you'll get from Veeder-Root Counters on all your machines and processes:

- Accurate, up-to-date production records
- Closer production *Count*rol
- Stop-and-Go *Count*rol (with preset counters that prevent over-runs and shortages)
- Measurement of material lengths
- More accurate costing
- Better basis for wage and incentive payments, piecework and payroll *Count*rol
- Simplified tax computation

Let us show you how easy it is to *count out* costly guesswork. Write:

You always "Know the score" when you count on Veeder-Root!

#1110 Measuring Counters are easily installed on many types of production and inspection machines . . . recording yards, feet, meters and other units of length. Furnished with smooth, knurled, grooved or rubber-faced friction wheels or forked coupling for attachment to rolls or shafts. *Send for new Condensed Catalog.*

Everyone can Count on

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This Week in STEEL

The Metalworking Weekly

May 11, 1959
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Passage of the watered down Kennedy-Ervin Bill by the Senate is just a start on labor reform.

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The Case of the Vanishing Taxes!

Acton Chance, STEEL's own private eye, gave such a good report on "The Case of the Vanishing Jobs" (Apr. 6, p. 99) that he was retained for this case also. You'll be amazed at what he has turned up.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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Rx FOR TIRED MACHINES

PATIENT: Style 215 Precision Boring Machine—built in 1939.

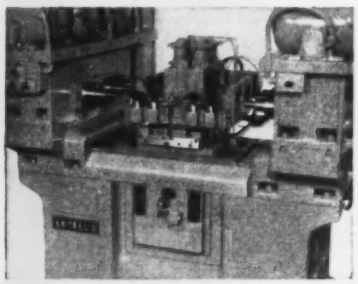
SYMPTOM: Speeds too slow for modern production, tooling outdated.

DIAGNOSIS: Continuous duty from 16 years of heavy work.

CURE: Ex-Cell-O Machine Renewal and Repair Service.

RECOVERY: Fast, complete, guaranteed.

FUTURE: Longer life, "like new" performance.



This 16-year-old Precision Boring Machine, recently rebuilt and retooled by Ex-Cell-O, is back on the job, giving profitable, "like new" service. Renewal or modernization of standard or special machines by Ex-Cell-O experts restores original precision and greatly extends the value of your investment. The service is quick, the workmanship thorough, and your complete satisfaction is guaranteed. Call your local Ex-Cell-O Representative, or write direct for full details.

XLO EX-CELL-O FOR PRECISION
58-52

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

behind the scenes

Private Eye Has New Case

Every full-blooded American metalworking management man who was raised on Mutt & Jeff knows that characters seldom spring into being at one bound. Sometimes they come on stage carrying a spear and wind up by taking the lead. Comic strip aficionados know that Mutt & Jeff were two bums who became national characters; that Dinty Moore, though seldom depicted, carried more weight than the strip's hero, Jiggs; that Popeye, who appeared originally as background decoration, took over top billing.

The new figure who appeared in STEEL (The Case of the Vanishing Jobs, Apr. 6, p. 99) seems to be establishing a place for himself. Private Eye Acton Chance, brainchild of Associate Managing Editor John Morgan, is up to his tricks again this week, beginning on Page 100. He is on the trail of The Vanished Taxes, and you don't have to be a mystery fan to carefully attend this story—you simply have to be a taxpayer. Confidentially, do you know anybody who isn't?

Briefly, friends, here's the pitch. Acton learns that Company X lost its bid to a Japanese firm on a government order for ship plates. Company X learned that it was underbid by about $37,000, and when the government began to crow about its savings, Company X called in Private Eye Chance. This boy poured himself a hoot of bourbon into a Dixie cup, called Clementine to tell her that he would be unable to catch her act at the Lucky Eleven night club, and was off like a shot —or, rather, with the shot.

He found out some amazing information. While the government saved $37,000 on the contract, it lost more than that in the taxes it would have collected from Company X and its employees in the event that Company X had filled the order. Acton traces lost taxes all the way down the line, but we're not going to pirate his report. You may read it for yourself, starting on Page 100 when he picks up his phone.

Drums Along the Ohio

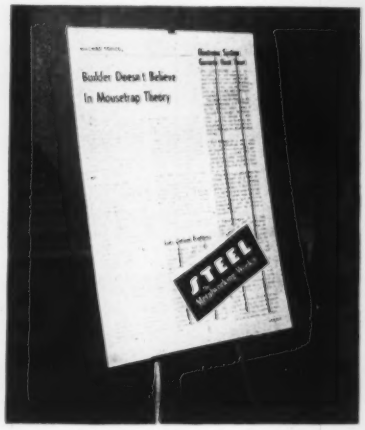
An old astrologer we know recently promised to read our horoscope if we bought him a drink. This kid was on intimate terms with Venus, and the moon, and alcohol; beyond that, he confessed that he had grown a third set of teeth, so it will be noted for the record that he was a man of some consequence.

After he had poured a moderate amount of that which stingeth like an adder down his patient esophagus, he said: "Friend, Jupiter is in a state of indecision, possibly because today marks the feast of Set. You are about to receive a communication from the Orient, maybe from Syria. Do as the man says."

Sure enough, next day we received a letter from the drummer in the Syrian Temple Shrine Oriental Band of Cincinnati. The drummer is Shafer O. Dieckmann, vice president, F. H. Lawson Co., an organization that has been producing sheet metal products in Cincinnati since 1816. That's a right smart piece back: Why, the War of 1812 had recently ended, and President Madison was winding up his second term among the ashes of Washington. It's safe to assume that there were few sheet metal shops in Ohio at that time—and even fewer Oriental bands.

Mr. Dieckmann wanted to use the drum poem (STEEL, Mar. 23, p. 6) in his Temple publication. We told him that STEEL would be quite pleased to be mentioned in the Syrian Temple Shrine publication. Why, when a genuine drummer picks up the beat from a business publication, it's cause for all hands to snap to attention.

Column Fills Lobby



Machine Tool Editor Robert Huber was pleasantly astonished a few weeks ago in Milwaukee. He walked into the lobby of Kearney & Trecker Corp. and ran into a 6 ft blowup of one of his own stories. K&T officials were so pleased with his column in the Mar. 16 STEEL (Builder Doesn't Believe in Mousetrap Theory, p. 130) they blew it up into a giant photostat, set it on an easel, and planted it in their lobby. "Seeing your stuff on a billboard makes you think twice," said Robert. "Imagine what would happen if you had made a little mistake!"

Shrdlu

(Metalworking Outlook—Page 91)

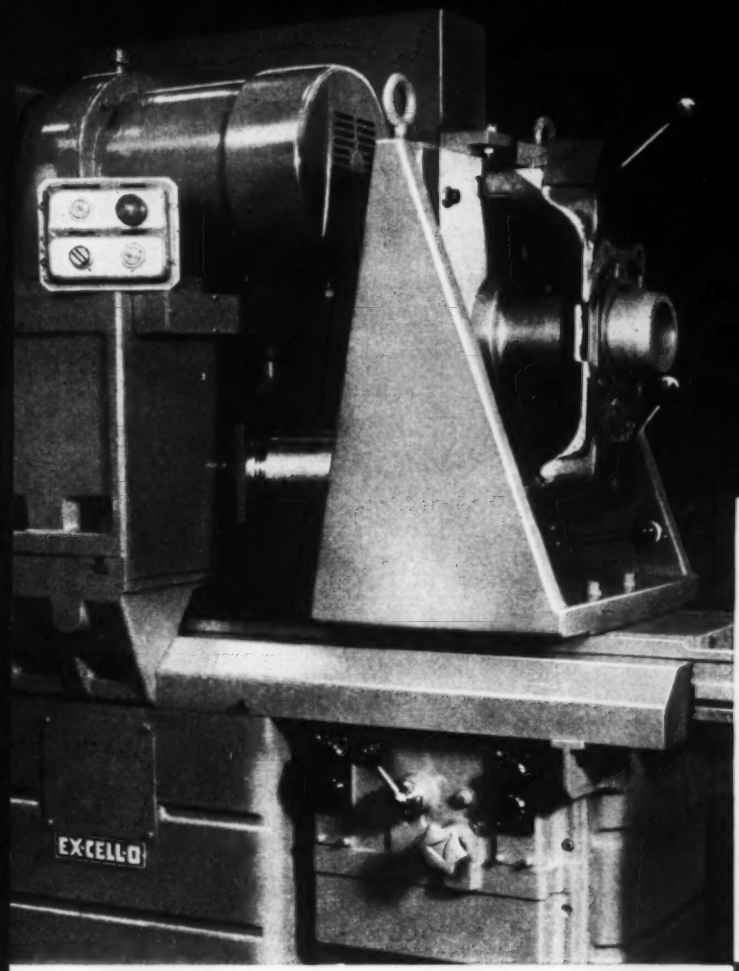
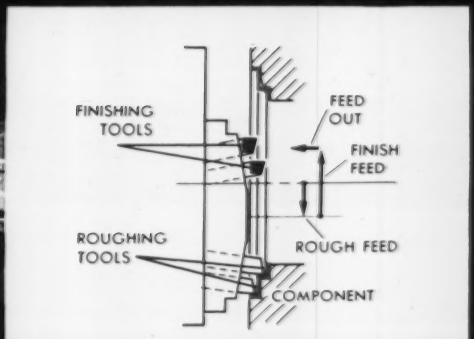


Table pad of the compact Style 2112-B provides ample space for this rugged fixture. Work is shown clamped in position.

RUGGED
PRECISE
ECONOMICAL



Machining cycle and tooling are outlined above, with roughing tools shown fed to depth; finishing is done at opposite end of the feed stroke.

Starter motor mounting of this cast iron clutch housing is faced and bored from rough to finish in one cycle.

59-18

Ex-Cell-O Style 2112-B bores, faces heavy casting in a single cycle

RUGGED for roughing—PRECISE for finishing—ECONOMICAL for short runs

Precision built for boring, turning and facing small or medium-size parts, the Ex-Cell-O Style 2112-B Precision Boring Machine is equally adept at tackling a heavy cast iron truck clutch housing.

The job is done quickly and accurately in one cycle. After clamping, rapid traverse brings the work into position for roughing tools to face two shoulders and plunge two bores. Feed is reversed for finish facing, and table feed-out doubles as a finish-bore pass. A standard hydraulically-operated Ex-Cell-O Facing Head carries the tooling.

Find out how the Style 2112-B or the double-bridge Style 1212-B can put similar flexibility into your operation. Write direct, or ask your local Ex-Cell-O Representative about combining these rugged, time-tested Precision Boring Machines with low-cost tooling for real economy in long runs or limited production.

EX-CELL-O FOR PRECISION XLO

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN
Machinery Division

EX-CELL-O PRECISION PRODUCTS INCLUDE: MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • THREAD AND GROOVE GAGES • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT.

Progress Report on

TWO NEW METHODS OF TUBULAR COMPONENTS PRODUCTION

Special metal-working techniques are being used by the Tapco Group to produce tubular members with distinct advantages for hundreds of aircraft, missile, industrial and consumer-product applications. Two of these techniques, Metal Gathering and Flotrusion*, offer important solutions to designers and engineers with the problem of tubular parts production.

METAL GATHERING

Using the Metal Gathering process, a portion of a metal tube is heated in a resistance unit, then "gathered" into a forged lump or mass at either or both ends of the tube. The heated end-mass can then be immediately extruded or forged to any desired rough configuration. After gathering or forging, any machining operation needed to finish the end is readily done right in the shops of the Tapco Group. Examples of tubing end-features produced by this process are illustrated in Figure 1.

Metal Gathering by the Tapco method offers several advantages: one-piece parts free from welds, brazing, or mechanical assembly; minimum machining for end features; no machining of tube interior to reduce wall thickness; better grain flow for greater strength and fatigue resistance; uniform heat-treatment because the whole part is formed from tubing; heavy sections are integral with tubing; no excess metal required, hence material cost is less; a rapid process for reproduction once tooling is established.

*Reg. Trademark — Used under License from Flotrusion, Inc.

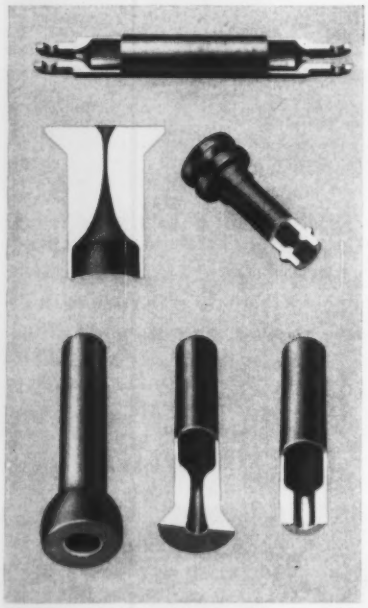


Figure 1—Typical end-features that are readily produced in tubing by the Tapco Group using the versatile, cost-saving Metal Gathering process.

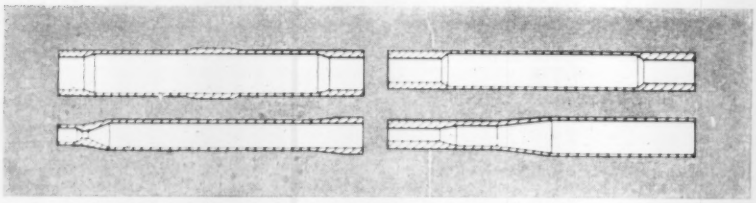


Figure 2—Flotrusion produces any desired variation in metal tubing, including those illustrated here.

The Tapco Metal Gathering process is readily applied to any metal, including steel, stainless steel, aluminum, titanium, and zirconium.

Designs are almost unlimited in size, complexity, and features. A broad range of tubing lengths, diameters, and wall thicknesses can be handled by the Metal Gathering process. Close tolerances can be supplied; grinding, polishing, or honing can be vastly reduced, and in some cases eliminated. One-piece parts replace multi-part assemblies. The process can also be used at various points along the length of the tubing.

FLOTRUSION

The Tapco Flotrusion process permits cold-drawing of tubing into various internal and external thicknesses, configurations, sizes, and shapes, shown in Figure 2. The process was developed to permit high-production rates of parts normally employing high-cost machining or polishing. Flotrusion can also be combined with the Tapco Metal Gathering process to produce an almost limitless variety of end-features, wall-thickness variations, and other features in tubing.

Tapco Flotrusion offers these advantages:

Heavy wall sections can be developed at one or both ends of cylindrical forms to provide for bearings, threads, or weldments,

Uniform wall thickness can be provided with smaller or larger diameters on the tube,

Surface finishes of excellent quality are standard, without expensive machining or polishing,

Burring and honing are not required.

Grain structure is improved, and additional heat-treatment can often be eliminated since cold-working improves tensile strength,

Tubing that has been heat-treated before Flotrusion gains added strength by cold-working,

Non-heat-treatable metals also gain strength by the cold-work effect of Flotrusion.

No excess material is required . . . Flotrusion requires only the exact volume of material that the finished part requires. Material cost is kept down.

All forgeable metals can be processed by Flotrusion . . . alloy and stainless steels, aluminum, titanium, zirconium, and others.

Tube diameters from 0.060" to 10" can be worked on present Flotrusion equipment at Tapco's completely-equipped plant. Lengths to 15 feet have been processed, but longer lengths and larger diameters are within the range of Tapco capabilities and facilities.

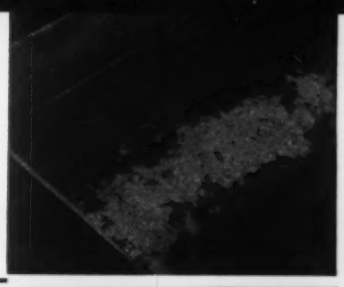
The configurations shown will give you ideas of how you can reduce the cost of tubular components by Metal Gathering or Flotrusion or a combination of the two. A 16-page design and data book on both processes will be sent to you on request.

TAPCO GROUP

Thompson Ramo Wooldridge Inc.

TRW

DEPT. ST-559 • CLEVELAND 17, OHIO



Each year, thousands of gallons of worn-out emulsions go down the drain

With them go millions of dollars that could be saved by controlling bacteria like these Pseudomonads

Now, ELCIDE 75 controls bacteria . . . prevents needless emulsion waste!

BACTERIA SHORTEN EMULSION LIFE. Bacteria enter soluble oil emulsions through the air, water, and normal plant debris. Feeding on the oil-water mixture, they multiply until they cause odor, corrosion, and emulsion breakdown.

WHEN EMULSIONS GO SOUR, COSTS GO UP. The machine has to be shut down, losing production and valuable time. Costly labor is required for the clean-out, recharging, and disposal of the waste emulsion. Additional soluble oil is needed, adding to the total cost of frequent recharging.

BACTERIAL PLATE COUNTS PROVE ELCIDE 75 INCREASES EMULSION LIFE. The light areas below are bacterial colonies that ruin soluble oil emulsions. The left plate shows the untreated emulsion. The center plate is the same emulsion treated with a popular germicide. The right plate proves Elcide 75's double control keeps emulsions clean and usable . . . *as much as 5½ times longer by actual plant tests.*

Untreated emulsion | **Emulsion treated with common germicide** | **Elcide 75—treated emulsion**

ELCIDE 75 IS A POWERFUL COMBINATION of Sodium *o*-phenylphenate and Sodium Ethylmercuri Thiosalicylate (Thimerosal) . . . related to one of the safest, most effective bacterial inhibitors used in the exacting field of medical surgery. Its double action controls a much wider range of bacterial growth than the commonly used germicides and "additives"; yet Elcide 75 is completely safe to employees and machinery.

JUST ONE OUNCE OF ELCIDE 75 ADDED TO EACH FOUR GALLONS OF STANDARD DUTY SOLUBLE OIL EMULSION . . .

1. Lengthens emulsion life.
2. Reduces soluble oil requirements.
3. Reduces downtime for recharging.
4. Decreases disposal of waste-oil.
5. Preserves emulsions during extended shut-downs.
6. Lessens bacterial health hazards.
7. Reduces bacterial corrosion of machinery and products.

If your company is not one of the many plants now using Elcide 75, we suggest you try it soon. Your own cost analysis should convince you of its value.

PRODUCT SPECIFICATIONS ELCIDE 75

(Lilly's brand of bacterial inhibitor for cutting fluids.)

Active Ingredients—Sodium Ethylmercuri Thiosalicylate (Thimerosal) and Sodium *o*-phenylphenate.

Package	Price per Gal.
1-gallon (4 per case) polyethylene	$8.50
5-gallon polyethylene	$8.00
55-gallon stainless steel	$6.50

Sold only through selected distributors.

ELCIDE 75™

PATENT PENDING

KEEPS COOLANTS FRESH AS A DAISY!

ELI Lilly AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION • INDIANAPOLIS 6, INDIANA

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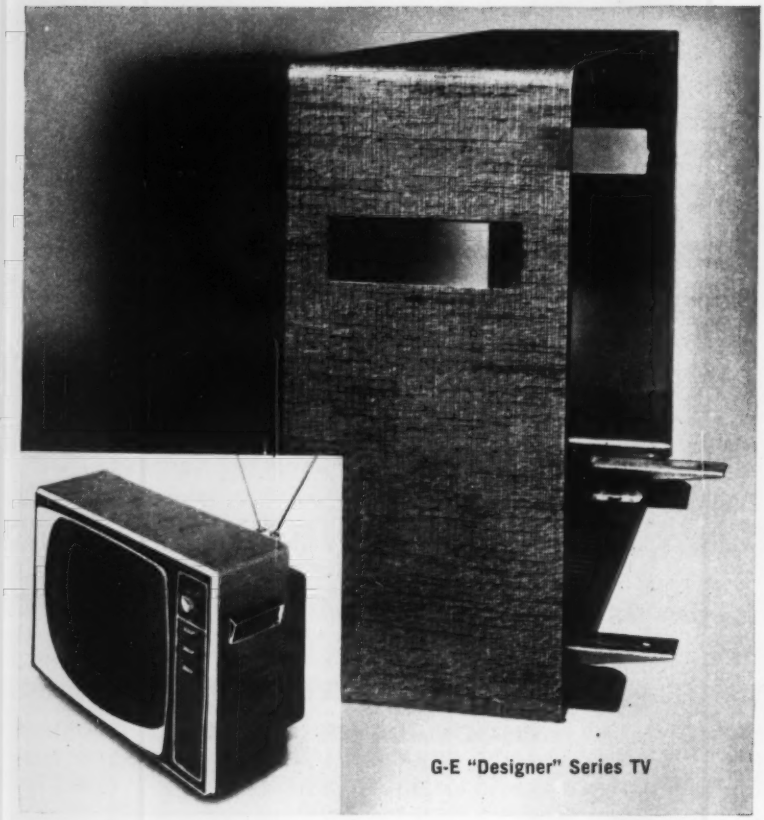

G-E "Designer" Series TV

G-E high-styles TV cabinet with embossed, silk-sheen Colovin, eliminates bare look of metal finishes

G-E rigidly tested many casing materials. Only Colovin laminate could offer the twin advantages of economical production costs *plus* the richness of multi-color printing and deep-texture embossing. **Without finishing,** painting or hand operations, the Colovin vinyl creates, to the eye and to the touch, the luxurious effect of brocaded Japanese silk.

Get the whole story in "Colovin Meets Metal." Laminate samples, colors and textures, test specifications, industrial applications, and list of laminators to whom we supply Colovin vinyl sheeting. Mail coupon for copy.

COLOVIN®

first and finest in metal laminates

COLUMBUS COATED FABRICS CORP., DEPT. ST-559, COLUMBUS 16, OHIO

Please send me your brochure, "Colovin Meets Metal."

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Company _____

Address _____

City _____ Zone _____ State _____

LETTERS TO THE EDITORS

Applauds Keeping Wages in Line

We wish to congratulate you on your fine article, "Keeping Wages in Line" (Apr. 13, p. 95). It was most interesting and informative, and I am sure it will be of use to our company.

Will you please send us 12 reprints?

Marion G. Reisner
Adams Co.
Dubuque, Iowa

• • •

I find this article most interesting. We would appreciate two dozen copies.

I. W. Strong
Executive Vice President
Appleton Electric Co.
Chicago

• • •

May I have a reprint of this excellent article?

Roy Mynsberge
Administrative Assistant
Design & Drafting
Bendix Products Div.-Missiles
Bendix Aviation Corp.
Mishawaka, Ind.

A Dissenting Opinion

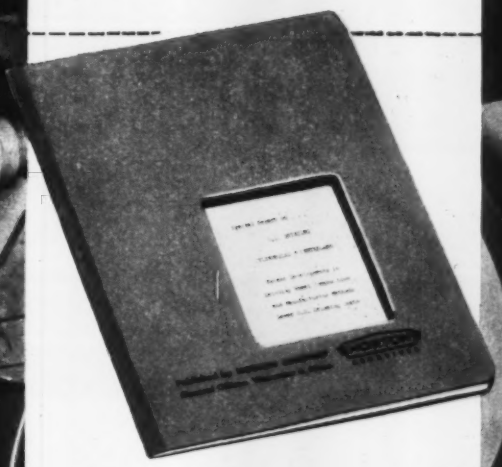
"The Case of the Vanishing Jobs" (Apr. 6, p. 99) is completely biased and unworthy of your usual objective reporting. It appears to have been borrowed from some union's files or from a political lobbyist.

The article makes a pretense of being statistical, yet the easy way in which the writer doubles the values of imports in the case of machine tools would make a statistician's hair stand on end.

Completely overlooked is the fact that in many cases, imports offer the American people something not available on the American market. Your own pages have attested to this fact with regard to cars. It is not that imported cars are cheaper in all classes—in many cases they are more expensive. Finally, the U. S. manufacturers are waking up to the needs of the motorists.

Another point overlooked is that, after

(Please turn to Page 12)



Get this New, Up-To-The-Minute Report *filled with* Inside Facts on Outside Grinding

A Report on O.D. Grinding, by Norton specialists, describes "tricks of the trade" that get the most out of cylindrical and centerless grinders . . . provides on-the-job performance of different grinding wheels . . . and analyzes the following highly efficient abrasives and bonds.

Abrasives. 44 ALUNDUM* (aluminum oxide) abrasive, an ideal cost-cutter for many O.D. jobs. 32 ALUNDUM abrasive, first choice for grinding various materials, including harder steels. The other time-tested Norton ALUNDUM abrasives are also included. And 37 and 39 CRYSTOLON* (silicon carbide) abrasives are best suited for grinding cast iron, nonferrous metals, carbides and other materials.

Bonds. G bond, biggest advancement in vitrified bonds, gives best results in most O.D. jobs, particularly crush-truing. Vitrified BE bond is another widely used favorite. Where CRYSTOLON abrasive is required, K bond is outstanding. B11 resinoid bond excels in uniformity with both ALUNDUM and CRYSTOLON wheels. For centerless feed wheels, R51 rubber bond assures complete regulating control without slippage.

Your Norton Man will be glad to work with you in solving O.D. problems, to assure you the lowest cost-per-piece produced. How this expert can bring you the value-adding, profit-boosting "Touch of Gold" is stated in the Report, available from your local Norton Representative — and as near as your phone. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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Take a close look at precision...

in MINIATURE!

This is a brass "jewel" nut. A .100-100 shoulder nut used in precision electrical instruments, it is mass produced by FISCHER to Class 3 tolerances, countersunk both sides and supplied deburred, cleaned, ready to install.

FISCHER specializes in *turned* nuts . . . standards, specials, odd sizes and types . . . having diameters from 1/8" and standard or special threads from No. "0". Each type is made to exacting specifications, delivered promptly, priced competitively. *And these are the reasons FISCHER is your best source for dependable miniature nuts.*

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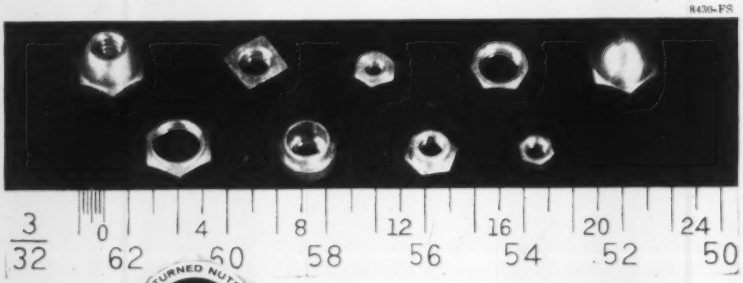


This enlarged scale photograph illustrates typical miniature nuts being supplied for electrical and electronic products.

there's no premium for precision at

TURNED NUTS Fischer SPECIAL MFG. CO. CINCINNATI, OHIO SINCE 1906

Fischer

FISCHER SPECIAL MFG. CO.
476 MORGAN STREET
CINCINNATI 6, OHIO

For details and specifications on Fischer brass and aluminum nuts, write for CATALOG FS-1000 and prices.

LETTERS

(Concluded from Page 10)

the war, the tremendous exports from this country were largely subsidized by U. S. foreign aid and were paid for by the taxpayers. This condition could not continue forever. In many cases, a condition of foreign aid was that the money be spent in the U. S. A. Naturally, our exports are diminishing now.

Under normal conditions, if foreign countries import from us, they must also export to us to obtain U. S. dollars. If we reduce our imports, it is inevitable that our exports will fall also. We cannot expect to be cheapest in every field. As long as we export more than we import, it proves we are cheaper or superior in a sufficient number of lines.

Every exporting country is faced with this same hard fact. In addition, as more and more underdeveloped countries become industrialized, the whole nature of world trade must shift.

W. L. Govan
Loewy-Hydropress Div.
Baldwin-Lima-Hamilton Corp.
New York

• *This article was not borrowed from some union's files. Most industrial unions take the opposite position. We are not against imports. We are opposed to high tariffs. We believe Americans should be cognizant that competition is mounting from abroad. One reason for this is that the U. S.-foreign wage gap is so wide.*

Seeks Rental Information

In Metalworking Outlook (Apr. 6, p. 93) we note with interest the announcement that GE rents industrial equipment. We would appreciate further details about this service.

K. G. Roth
Mack Trucks Inc.
Allentown, Pa.

• *We suggest you write to General Electric Co., Schenectady, N. Y., requesting Bulletin No. GEA-6829.*

Wants to Pass on Information

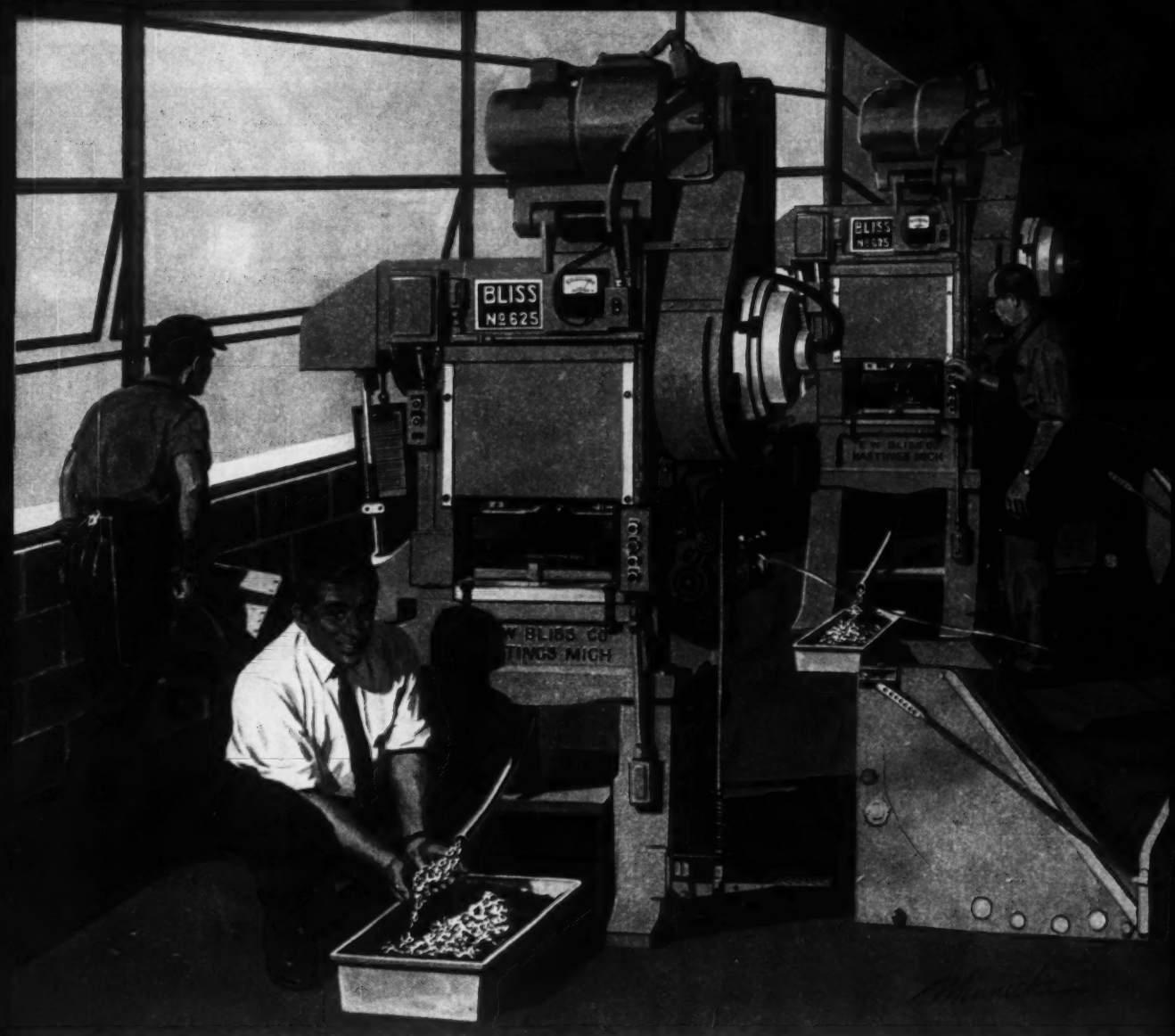
I've just read "What's Coming in Welding" (Mar. 30, p. 74) and found it interesting and informative. May I have an additional copy to pass this information on to those who are interested?

Lloyd R. Larsen
Weld Dept.
Dravo Corp.
Neville Island, Pa.

Invaluable

We find your "Metal Selector" (Oct. 20, 1958, p. 165) invaluable for use in our analytical laboratory. May we have three copies of the current issue?

J. E. Van Dien
Director
Applied Spectrochemical Laboratories
Glen Rock, N. J.



"I get 1200 parts a minute from each of these presses...

...all day long!" And production like that continues day in, day out. For Bliss High Production presses are especially designed for continuous high speed operation. Counterbalanced shaft, massive tie rod frame... square gibbing... features like these add up to *enduring* speed. For ease of operation there's ample room in front and back for die setting and space *under* the press for tote boxes or stacking chutes. Naturally, if you use large quantities of stampings this is the press that makes them. You will, however, be surprised to learn, that H-P presses can be set up so quickly and efficiently that more and more firms are using them for short run work.

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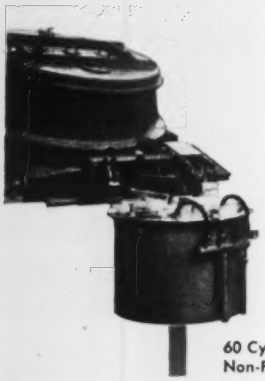

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Non-Ferrous Melting

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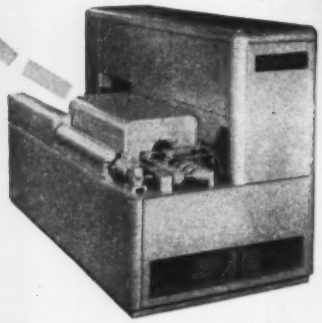
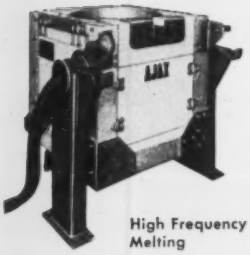
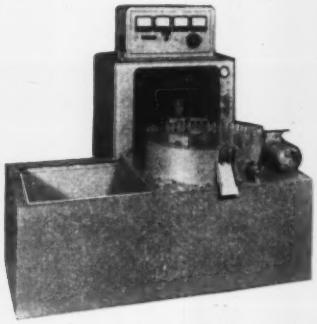


60 Cycle
Billet Heating



High Frequency
Melting



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- DUAL AND HIGH FREQUENCY FORGE HEATERS
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INDUCTION HEATING IS

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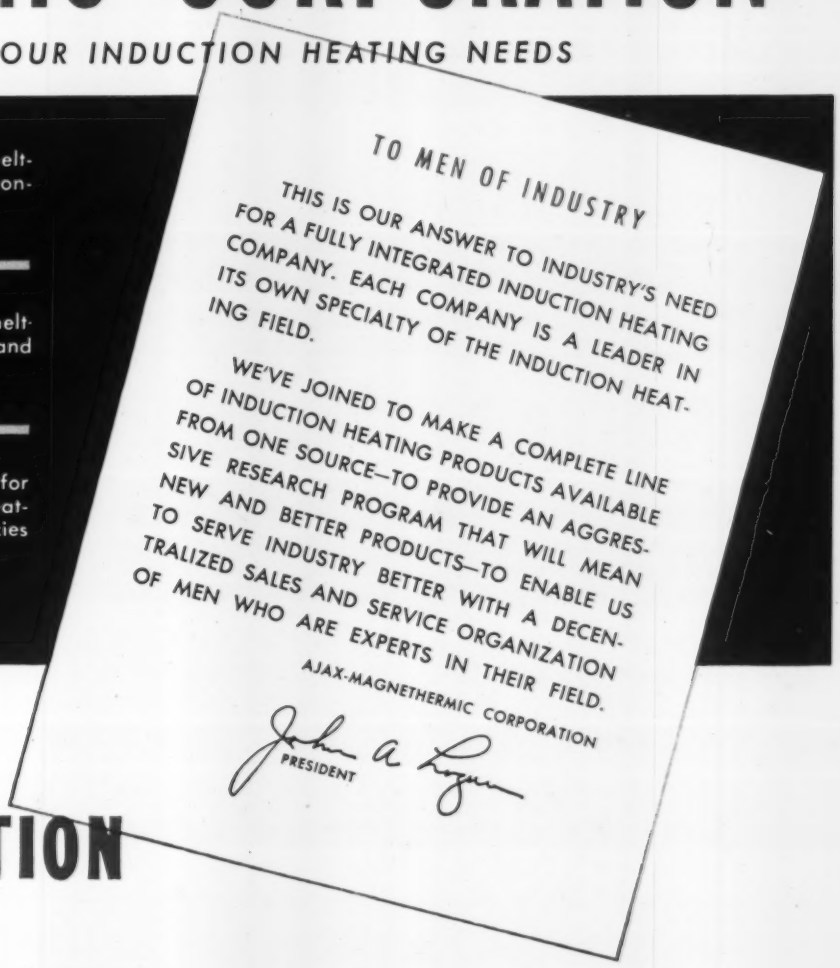

TO MEN OF INDUSTRY

THIS IS OUR ANSWER TO INDUSTRY'S NEED FOR A FULLY INTEGRATED INDUCTION HEATING COMPANY. EACH COMPANY IS A LEADER IN ITS OWN SPECIALTY OF THE INDUCTION HEATING FIELD.

WE'VE JOINED TO MAKE A COMPLETE LINE OF INDUCTION HEATING PRODUCTS AVAILABLE FROM ONE SOURCE—TO PROVIDE AN AGGRESSIVE RESEARCH PROGRAM THAT WILL MEAN NEW AND BETTER PRODUCTS—TO ENABLE US TO SERVE INDUSTRY BETTER WITH A DECENTRALIZED SALES AND SERVICE ORGANIZATION OF MEN WHO ARE EXPERTS IN THEIR FIELD.

AJAX-MAGNETHERMIC CORPORATION

John A. Lyon
PRESIDENT

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If the shape of your part is tubular, conical, hemispherical, or curvilinear, hydrospinning by the Ingersoll Kalamazoo Division may save you costly machining expense and time. If you want a seamless part, try hydrospinning. If you want precise wall thickness, turn to hydrospinning. Hydrospinning saves on metal, time and labor.

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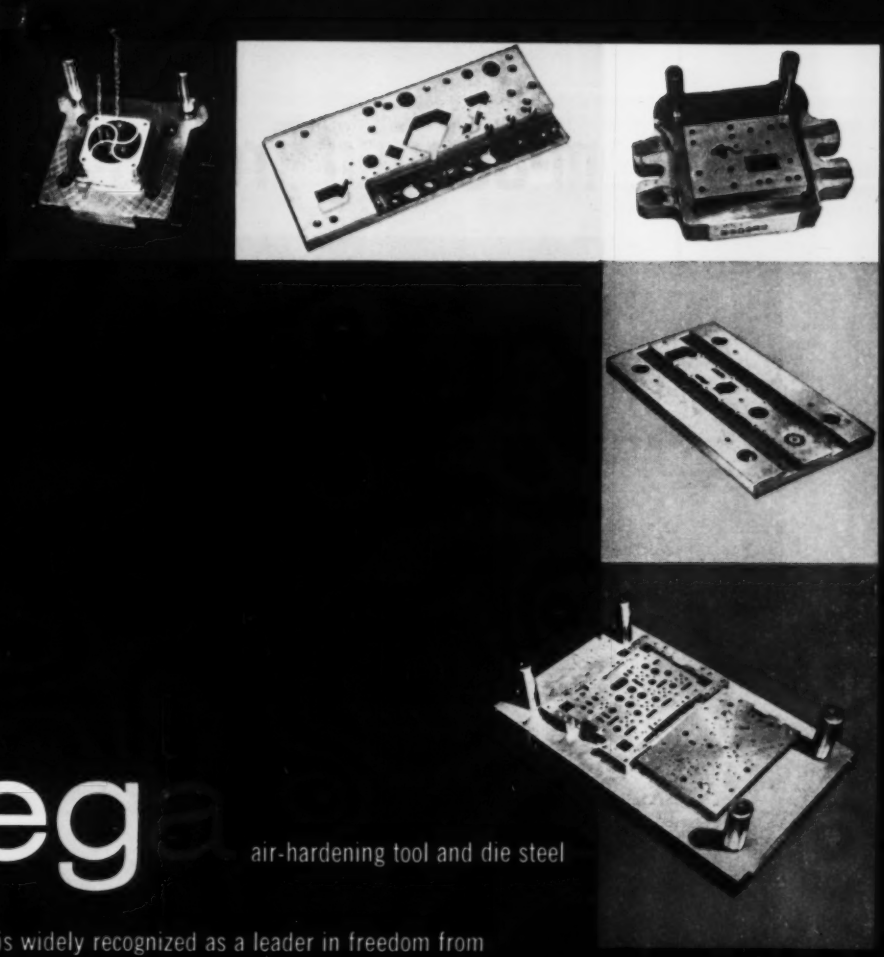

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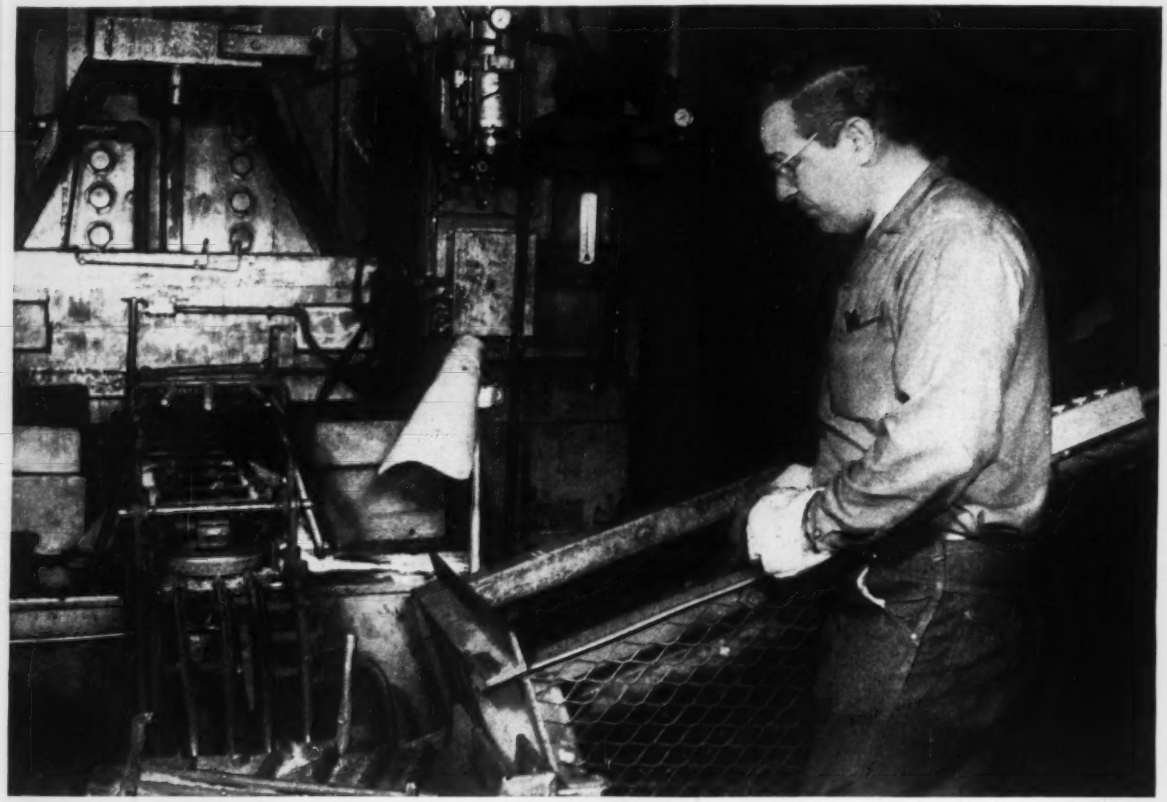

Alloy steel billets, four inches square, are fed into a seven-step forging press and emerge at the end as differential ring gear blanks.

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The Ford Motor Company, to maintain its reputation for quality, specifies only the finest steels. Ford uses Republic SAE 4028H series hot rolled Alloy Steel in forging the highest quality ring gears.

Republic Alloy Steel forging billets 4-inches square, are sheared into 5-inch lengths, heated, and put into an automated forging press. The billet goes through seven forging steps, passing from one die to another automatically. After forging the blank is annealed.

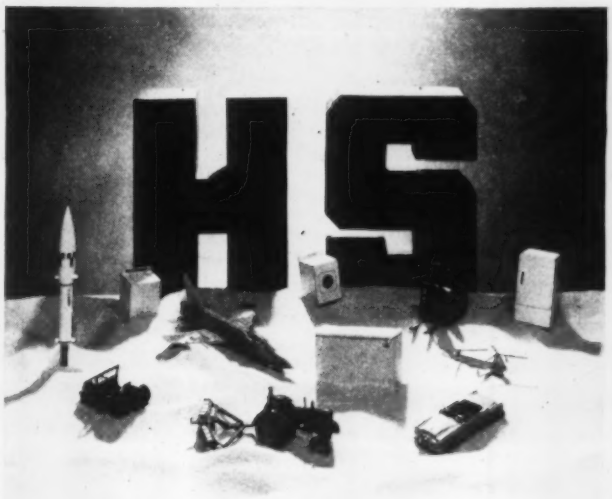
Alloy steels are unusually tough and strong. They can absorb sudden shock and impact without failure. Respond uniformly to heat treatment producing hard, wear-resistant surfaces around tough cores. This tough integral structure provides greater strength with greater dependability.

Field metallurgists working closely with Ford metallurgists and engineers in their own plants provided a metal that is tough and strong enough to withstand shock, impact, stress, and fatigue.

Republic's famed 3-Dimension Metallurgical Service Teams—field, mill, and laboratory metallurgists—are available to help you in selection, application, and processing of the right alloy steel for the job. It's confidential. There's no obligation. Send coupon for more information.

REPUBLIC NYLOK® STUDS solve fastening problem for Gravely Tractors, Inc., Dunbar, West Virginia. Problem: Find a dependable fastening method for tractor-attached rotary cultivators. Fastener must withstand constant shocks and pounding of rotary culvitating. Solution: Use Republic Nylok Studs. A special nylon insert assures positive locking at any position, even under severe shock, vibration, tension. Prevents all play. Utilizes metal-to-metal contact of opposing threads for locking. Republic Nylok Fasteners—studs, nuts, cap screws—resist heat, cold, moisture. Can be re-used. Interested? Mail coupon for full facts.

HARD DRAWN ROUND STEEL SPRING WIRE is providing outstanding performance in automotive seat and back cushions, and in furniture and bedding applications. Performance is assured by Republic quality. Standard High Carbon Spring Wire and MB High Carbon Spring Wire are produced by specialists who know and understand both steelmaking and high carbon wire practices. They know spring forming machines and the importance of physicals, finish, cast, and size accuracy in the finished product. Wire metallurgists will assist you in selection, application, and processing. Send coupon for details.



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CASE HISTORY 1750

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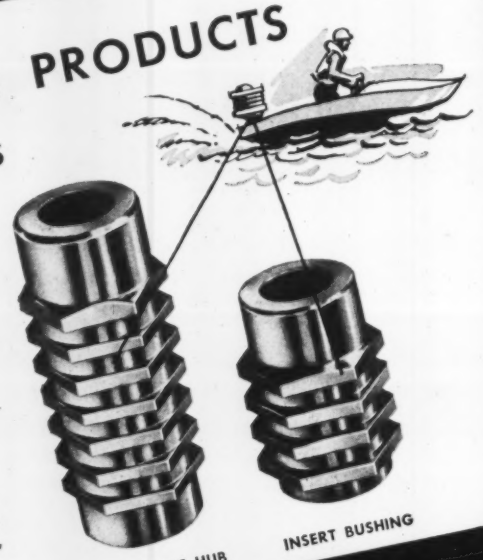

INSERT DRIVE HUB

INSERT BUSHING

THE MAN FROM MUELLER BRASS CO.

can give you sound, unbiased advice on the one best method of making your parts because Mueller Brass Co. is the only fabricator in the country offering all these methods of production. An experienced "Methods Analysis Department" has at its command a complete knowledge of the advantages and limitations of each production process. This unique technical service is your assurance of getting the best product at the best price . . . made the one best way.

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MUELLER BRASS CO.

CO. METHODS · ANALYSIS · SERVICE

economical method of producing parts

CASE HISTORY 226

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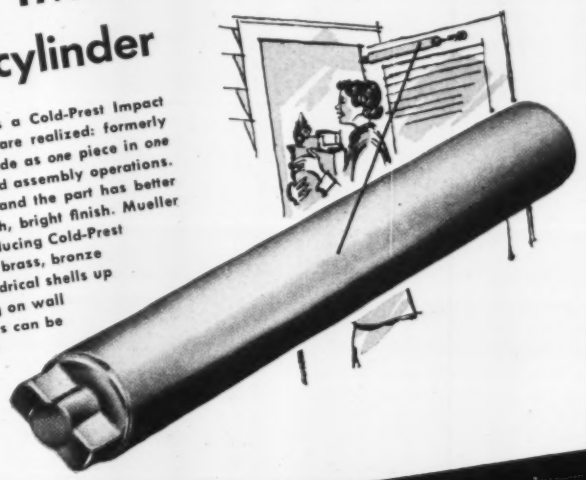

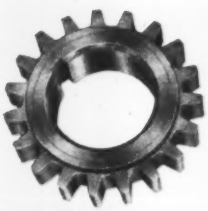

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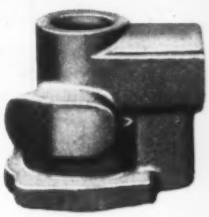
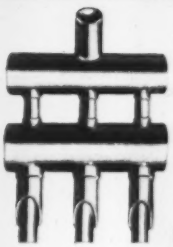


SAND CASTINGS



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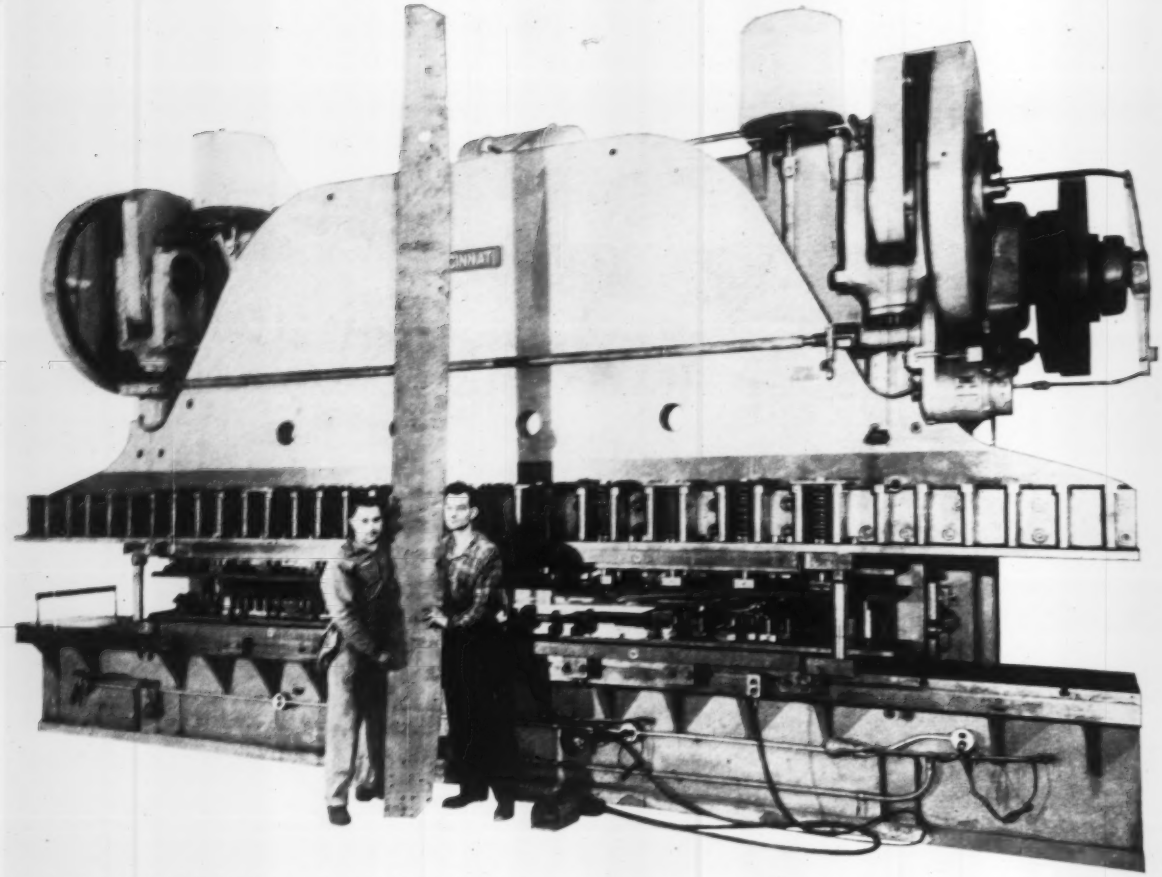
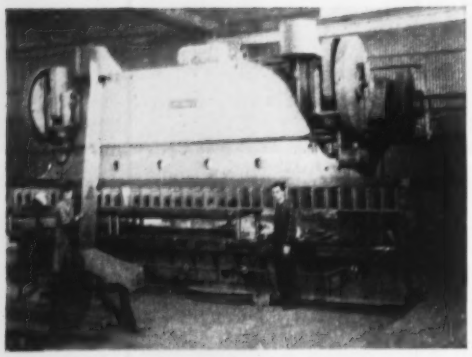


Punching floor to floor time cut from 36 to 1⅓ minutes.

Photos courtesy Fort Wayne Structural Steel Co., Inc.

70 minutes cut to 2.6 min.



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CALENDAR
OF MEETINGS

May 11-13, American Management Association: Special labor relations conference, LaSalle Hotel, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

May 11-13, American Society of Mechanical Engineers: Joint conference with American Institute of Electrical Engineers and Institute of Radio Engineers on automatic techniques, Pick-Congress Hotel, Chicago. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

May 11-14, American Mining Congress: Coal Show, Public Auditorium, Cleveland. Congress' address: Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

May 12-14, American Society of Mechanical Engineers: National production engineering conference, Statler-Hilton Hotel, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

May 13-14, Porcelain Enamel Institute: Midyear conference, Edgewater Beach Hotel, Chicago. Institute's address: 1145 19th St. N.W., Washington, D. C. Managing director: John C. Oliver.

May 13-15, American Supply & Machinery Manufacturers Association: Triple industrial supply convention. Statler-Hilton Hotel, Dallas. Information: Thomas Associates, Keith Bldg., Cleveland 15, Ohio. Business manager: W. B. Thomas.

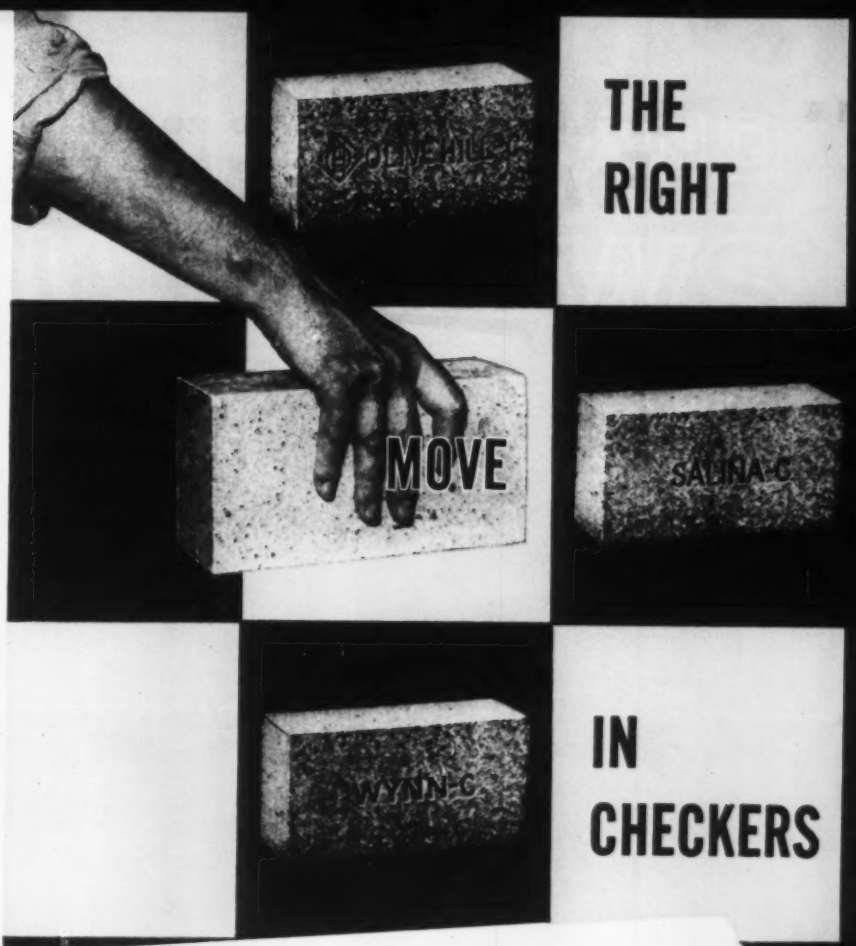
May 13-15, Machinery Dealers National Association: Annual meeting, Plaza Hotel, New York. Association's address: 1346 Connecticut Ave. N.W., Washington 5, D. C. Executive director: R. K. Vinson.

May 14-15, National Association of Sheet Metal Distributors: Spring meeting, Pick-Roosevelt Hotel, Pittsburgh. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

May 14-17, National Tool & Die Manufacturers Association: Spring board meeting, Marott Hotel, Indianapolis. Association's address: 907 Public Square Bldg., Cleveland, Ohio. Executive vice president: George S. Eaton.

May 17-20, American Institute of Chemical Engineers: Spring meeting, Hotel Muehlebach, Kansas City, Mo. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

May 17-20, Automotive Engine Rebuilders Association: Annual meeting, Royal York Hotel, Toronto, Ont. Association's address: 901 Roosevelt Bldg., Indianapolis 4, Ind.



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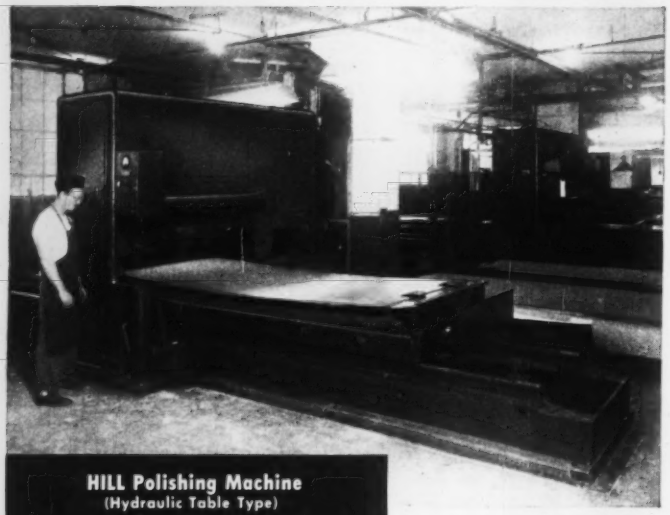

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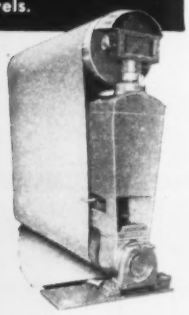

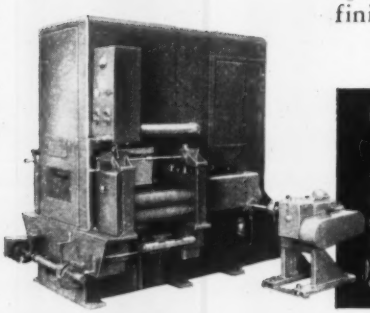

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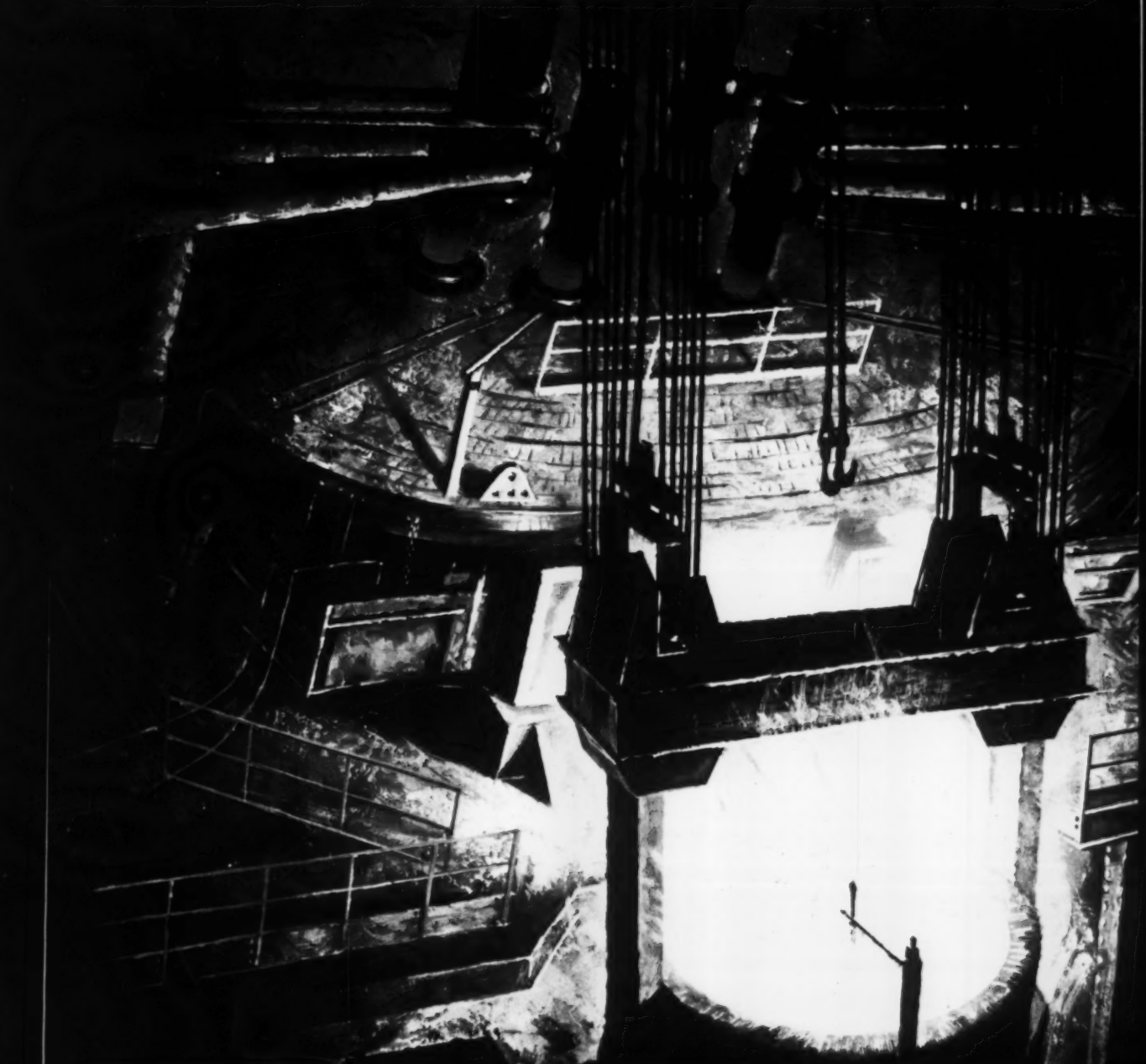

SIX-ELECTRODE ARC MELTING FURNACES

By Samuel Arnold 3rd
Consulting Engineer

SIX-ELECTRODE ARC MELTING FURNACES

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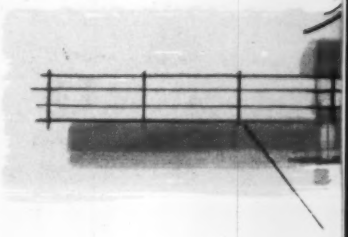

Samuel Arnold 3rd graduated from Pennsylvania State University in 1913 with a B.S. Degree. In 1918, he received an E.E. Degree from the same University. From 1916 to the present, he has been primarily concerned with the development, sale and use of Heroult electric arc furnaces. In 1927, he developed the use of multiple voltages as applied to arc furnaces. In 1928, he was responsible for the design of the first successful six-electrode steel melting furnace. Since 1925, Mr. Arnold has been Consulting Engineer for American Bridge Division of United States Steel Corporation.

INTRODUCTION

To keep pace with the demand for electric furnace steel, electric furnaces have continued to increase in size and use of power. In 1906, the first heat of electric furnace steel was made in the United States. The furnace used for this heat was built in France by Dr. Heroult and consisted of a rectangular shell with two electrodes for single phase operation. Shortly thereafter three phase power was utilized and the logical design was a cylindrical shell. These early furnace designs had a relatively shallow bath and were equipped with transformers of low capacity.

During the years that have followed, the development of arc furnaces has primarily consisted in increasing the shell diameters and height to give deeper hearth capacity as well as greater volume. At the same time, considerably increased transformer capacities have been furnished, together with controls of greater sensitivity. At present, the largest three-electrode cylindrical furnace has a shell diameter of 24′-6″, and power loads slightly in excess of 35000 KVA have been used. The 24′-6″ furnace has made heats greater than 200 tons, but perhaps the best

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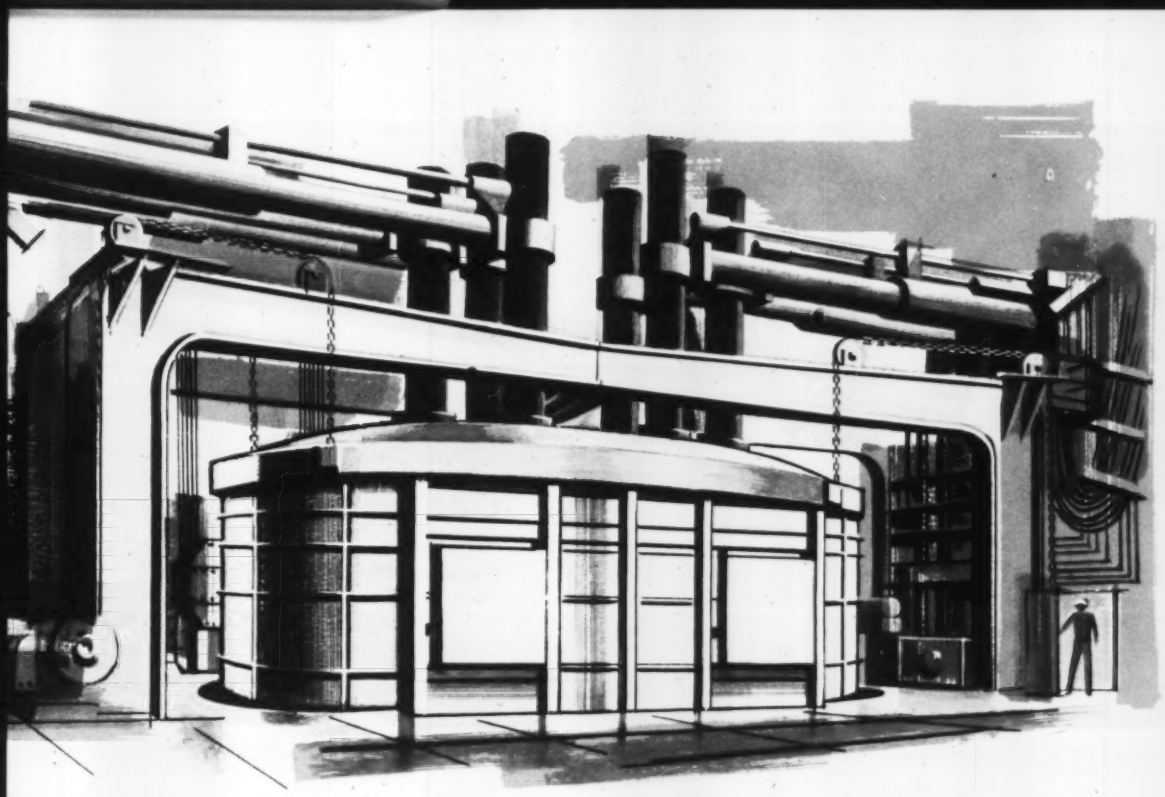

operating capacity is approximately 180 tons. Without question, larger furnaces can and will be built in the future, and it is important to consider the most effective design.

For many years, the primary function of arc furnaces has been the melting and refining of special high grade carbon and alloy steels. However, in the last fifteen years, the use of arc furnaces has been extended to the manufacture of ordinary carbon steels, and in that field they are competing favorably with open-hearths. The reason that arc furnaces can compete so favorably has been primarily due to the wide use of the removable roof for quick charging, and the use of larger transformers and better regulation. Since the Second World War, light scrap has been used in arc furnaces almost exclusively, and as the use of this light scrap gives greater area to absorb radiant energy, higher power, when properly applied, can speed the melt.

In the melting down process, high power applied to modern three-electrode furnaces is now used only until a bath has been partially formed. As a result, the use of high power is limited as to time, and, therefore, full use of the transformer cannot be obtained. This in turn decreases the load factor and increases the time to melt and production cost. How then can we obtain a better utilization of the power available in these proposed larger furnaces?

With three electrodes, there are three concentrated areas for the release of energy, and as long as the scrap area is maintained, this high energy can be absorbed. However, once the bath has been formed, superheating can occur in the energy liberating areas. This increases the energy radiated to the refractories. Unless the power load is diminished to correspond to the rate of heat absorption in the charge, refractory deterioration rapidly occurs. The logical answer to this problem as larger furnaces are built, is to provide more energy releasing areas for the same amount of power used, thus taking advantage of power availability to provide an efficient quick melt with a minimum of refractory deterioration. A multiple electrode furnace is, therefore, to be considered.

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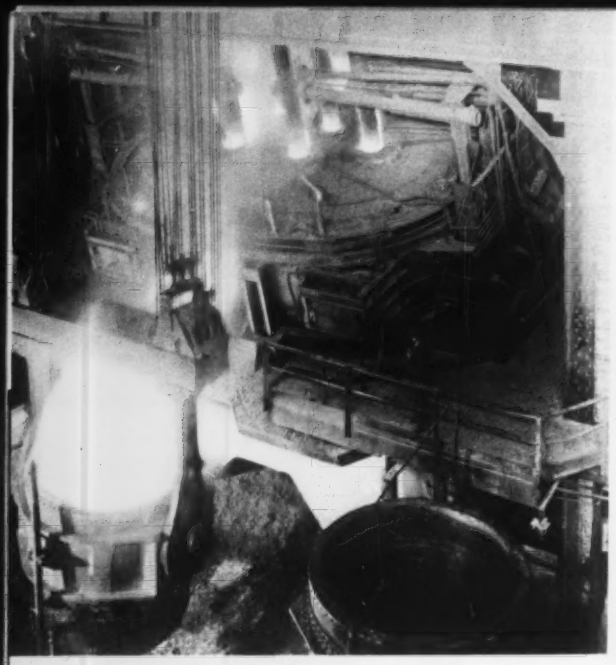

BIRTH OF SIX-ELECTRODE FURNACE

Thirty-one years ago the writer, riding by train from Pittsburgh to Canton, made a sketch of a six-electrode elliptical furnace and submitted the idea to the engineers of the Timken Roller Bearing Company. This preliminary design was slightly modified as to size, and a short time later the original elliptical shell six-electrode furnace was built by American Bridge and installed at the Timken Plant. I believe that this has been the only successful six-electrode steel melting furnace ever used. The shell of elliptical shape has an inside long dimension of 29 ft. and a width of 20 ft. The hearth is relatively shallow, and it is arranged for charging through two doors by means of a charging machine of the open-hearth type. The unit is equipped with two 7500 KVA transformers.

In 1953, Mr. James K. Preston, of the Timken Roller Bearing Company, presented a paper at the Annual Electric Furnace Committee meeting of the A. I. M. E. His paper was entitled "Comparative Melting Rates of an Elliptical Six-electrode Furnace and a Circular Three-electrode Furnace." Mr. Preston's conclusions definitely indicated that melting time and bath oxidation were more rapid in the old elliptical unit than in a modern three-electrode furnace, and stated in his conclusions that "the reason for this appears to be a result of the better distribution of the radiant energy from the arcs."

The question now arises as to why this prototype six-electrode furnace has not been further developed and utilized. The probable answer to this question is the fact that with the use of the removable roof and higher transformer capacities, together with the availability of light scrap, the three-electrode furnace has been developed to the present capacities as a relatively efficient unit.

With a 24 ft. diameter shell three-electrode furnace and 35000 KVA transformer capacity, 24″ electrodes are necessary. To provide movement for these electrodes, motors of 25 H. P. have been used. To control these motors, requires a motor generator set with driving motor capacity approximating 75 H. P. per electrode. If larger three-electrode furnaces are built with as much as 50000 KVA transformer capacity, still larger electrode sizes will be required. This in turn would require heavier electrode arms, with motor sizes necessarily increased.

To introduce 40000 KW from a 50000 KVA power transformer at an acceptable power factor would require relatively high secondary voltages. This increased voltage would in turn increase the length and configuration of the arcs. Problems of carrying the heavy current to the furnace would also be multiplied.

In the November issue of Carbon & Graphite News, one of the problems of utilizing power in electric furnaces has been ably outlined by Mr. W. E. Schwabe. The problem discussed by Mr. Schwabe relates to the introduction of equal amounts of energy at each electrode tip. Because of the inherent design of the bus and cable structure, the variation in impedance in the phases results in a variation of the amount of energy liberated at each arc. The unbalancing effect and its correction will be greatly magnified as current values are increased.

ADVANTAGES OF SIX-ELECTRODE FURNACE

If increased furnace holding capacities are to be used in the future, serious consideration should be given to the six-electrode unit. The advantages to be had from a six-electrode furnace as compared with a three-electrode furnace are as follows:

1. Six energy liberating areas would be had instead of three to better utilize the power available.
2. Lower secondary voltages and lower current values can be used, thus minimizing the problem of carrying the power to the furnace and liberating the energy uniformly.

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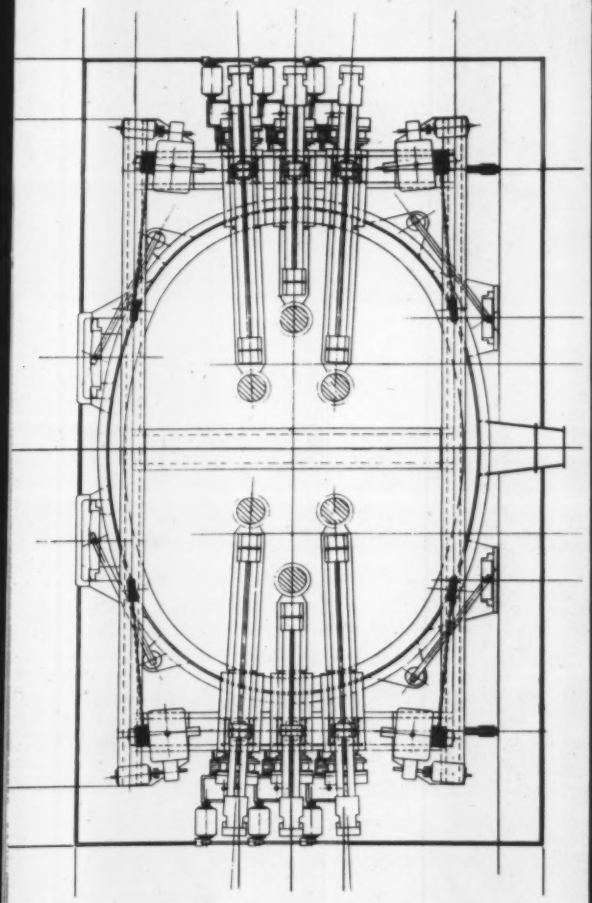
3. A six-electrode furnace with an elliptical shell will offer less difficulty of bottom and side wall maintenance. This is primarily due to the fact that the lateral spacing between front and back wall would be less than on an equivalent holding capacity three-electrode unit. Refractory losses would also be materially reduced, due to the fact that less heat will be radiated to the refractories from the bath, with a greater amount of the liberated energy absorbed by the charge. With increased refractory life, furnace down time will be less.
4. With smaller electrodes, as well as electrode holders and masts of less weight, electrode motor sizes are materially reduced. Therefore, more accurate electrode regulation can be obtained. Futhermore, the handling and servicing of smaller electrodes minimizes cost.

A BASIS FOR COMPARISON

As a means of comparing a large six-electrode furnace with a present day large three-electrode furnace, a preliminary design of a 250 ton holding capacity, six-electrode unit has been made. The shell of this furnace would be an ellipse with a dimension of approximately 35 ft. in length and 24 ft. in width. It would be equipped with two 25000 KVA transformers and would use two sets of three 20″ electrodes arranged in a similar way to the original six-electrode furnace (see cover illustration). The side frames would be connected together to form a gantry designed to carry the roof. The roof would be lifted and the gantry and roof moved out over the tapping side to permit charging. If two six-electrode furnaces were installed, a central transformer vault would house two of the transformers, with all of the switching equipment at the central location. On each opposite side, there would be a smaller transformer vault to house the additional transformers, panel and regulator.

Calculated data pertaining to a 250 ton holding capacity 35′0″ x 24′0″ six-electrode furnace equipped with two 25000 KVA transformers and using 20″ electrodes, is as follows:

1. Furnace to be initially charged with 125 tons of scrap and a 125 ton re-charge made.
2. 50000 KVA at 80% power factor, 40000 KW demand.
3. At 85% power-use factor* for melt, 34000 KW average power load.
4. Assume 400 KWH per ton required to melt scrap only.
5. 125 tons at 400 KWH per ton, 50000 KWH required to melt initial charge.
6. At 34000 KW average load, time required to melt initial charge, approximately 1 hour 28 minutes.



ESTIMATED HEAT CYCLE

(35′ 0″ x 24′ 0″ Six-Electrode Furnace, Ordinary Carbon Steels)

Fettle bottom		25 min.
First charge, 2 buckets, 62½ tons each		30 min.
Melt first charge	1 hr.	28 min.
Re-charge, 2 buckets, 62½ tons each		30 min.
Melt re-charge	1 hr.	28 min.
Refine & bring to temperature	1 hr.	0 min.
Tap		20 min.
TOTAL TIME		5 hrs. 41 min.

6 hour heats, or 4 heats per 24 hours for ordinary carbon steels

*The term power-use factor refers to the average amount of power that is normally used at a given power demand.

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It is to be noted that an 85% power-use factor has been utilized in calculating the average KW power load during the melting period. It is highly probable that this power-use factor would be increased due to the relatively low amount of energy to be released at each electrode tip, and its more rapid absorption by the charge. Any increase in power-use factor would reduce the time of melt. The time required for bringing the bath to temperature and refining for ordinary carbon steels might also be reduced, and it is probable that more than 4 heats can be obtained in 24 hours.

In the above calculations, the use of oxygen has not been considered. If oxygen is used, the heat time will be materially reduced. On this basis, it is possible to produce 5 to 6 heats per 24 hours.

ESTIMATED ANNUAL PRODUCTION RATES

(Six-electrode 250 ton furnaces and three-electrode 180 ton furnaces)

Furnace availability 95% for average of 684 hours per month.

SIX-ELECTRODE FURNACE—50000 KVA

6 hour heats—250 tons per heat
41.6 tons per hour (conservatively estimated)
28,454 tons per month—341,448 tons per year per furnace

THREE-ELECTRODE FURNACE—35000 KVA

27.5 tons per hour (obtained with existing furnaces)
18,810 tons per month—225,720 tons per year per furnace

Two six-electrode 50000 KVA furnaces—approximately 680,000 tons per year
Three three-electrode 35000 KVA furnaces—approximately 675,000 tons per year

The production figures as outlined are for **comparative purposes only.** With modern transformers equipped with heat exchangers, overloads can be carried and together with the use of oxygen, average production in excess of 27.5 tons per hour of ordinary carbon steels can be obtained from the three-electrode 35000 KVA furnaces. This possibility of increased production holds true to an even greater extent when the six-electrode furnace is considered, for the reason that the increased power can be more readily utilized. With the use of oxygen and utilization of increased power, production in excess of 50 tons per hour can no doubt be obtained with the six-electrode furnace. It is possible with very light scrap that more than one re-charge may be necessary. This would apply to either the six-electrode or three-electrode furnace.

In the foregoing comparison of large six-electrode with large three-electrode furnaces, no consideration has been given to the use of high intensity gas burners to facilitate melting, nor has consideration been given to the use of hot metal. Based on existing practice, there is no question but that hot metal can be utilized as a part of the charge, perhaps as much as 50% of the charge. In the use of hot metal, the six-electrode furnace will have the advantage of better distribution of the energy without superheating portions of the bath.

COMPARISON OF POWER DEMAND

Three (3) 24'0", 35000 KVA three-electrode furnaces, two melting at 35000 KVA each, and one refining at 10000 KVA, with diversity factor of 85%, 68000 KVA demand.

Two (2) 35'0" x 24'0", 50000 KVA six-electrode furnaces, one melting at 50000 KVA, one refining at 15000 KVA, with diversity factor of 85%, 55250 KVA demand.

It may be said in connection with the two six-electrode 50000 KVA furnaces that a period could occur when both units would be melting. This same probability of melting times coinciding could also occur with three three-electrode 35000 KVA furnaces. In either case, the best operating pre-determined maximum demand would of necessity be utilized. This does not alter the fact, however, of an indicated lower power demand for the two six-electrode furnaces.

Comparison of Kilowatts of available and usable power per ton of charge during melt down

24'0" Furnace, 180 ton total heat, 90 ton charge

35000 KVA, 80% power factor, 28000 KW
90 ton initial charge, energy introduced per ton of charge, 310 KW
Energy introduced per ton of charge per electrode, 103.3 KW

35'0" x 24'0" Furnace, 250 ton total heat, 125 ton charge

50000 KVA, 80% power factor, 40000 KW
125 ton initial charge, energy introduced per ton of charge, 320 KW
Energy introduced per ton of charge per electrode, 53.3 KW

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As the energy to be liberated per electrode per ton of charge for the 50000 KVA six-electrode furnace is but slightly more than half of the energy which must be liberated per electrode per ton of charge for the 35000 KVA three-electrode furnace, it follows that the rate at which energy is to be absorbed by the charge at each electrode tip is also but slightly more than half. As this lesser amount of energy per electrode is more readily and more rapidly absorbed, it means that the full advantage of the existing available power can be obtained. This in turn increases furnace melting efficiency, decreases refractory deterioration and decreases the time required to melt.

COST COMPARISON

(2 six-electrode 50000 KVA furnaces with 3 three-electrode 35000 KVA furnaces)

Capital Costs

As to initial expense, it is estimated that two 50000 KVA six-electrode furnaces installed would not be far different in cost than if three 35000 KVA three-electrode furnaces were used. In connection with the shop, however, while the length of the building might be slightly reduced, larger ladle cranes would be required for the two six-electrode units as compared with the three three-electrode furnaces. These larger ladle cranes would, of course, entail a somewhat heavier building and slightly greater cost.

Operating Costs

Refractories: As previously mentioned, refractory costs for six-electrode furnaces should be materially less than for three-electrode units. This is primarily due to the better absorption of the energy by the scrap and lesser amounts of radiant heat reflected to the side walls and roof. Decreased refractory cost of 12% to 15% could, no doubt, be obtained.

Electrodes: Electrode consumption and electrode cost per ton of steel produced in two six-electrode furnaces will be approximately the same as that obtained with three three-electrode units.

Power: Because of the lower power demand required for two six-electrode furnaces, the cost per unit of power will probably be decreased over that which could be obtained in operating three three-electrode furnaces. This decrease may be 3% to 5% of the power cost.

Labor: Two six-electrode furnaces will require two crews per turn, and three three-electrode furnaces will require three crews per turn. Assuming direct furnace labor at 50% of the total furnace shop labor, there is indicated a saving of 16⅔% in labor cost.

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Delivers highest quality product—
Closer temperature control possible.

Lowers capital investment—
40% less than equivalent open-hearth capacity.

Saves space—
Savings of 25% and more vs. open hearths producing same tonnage.

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Overall Costs

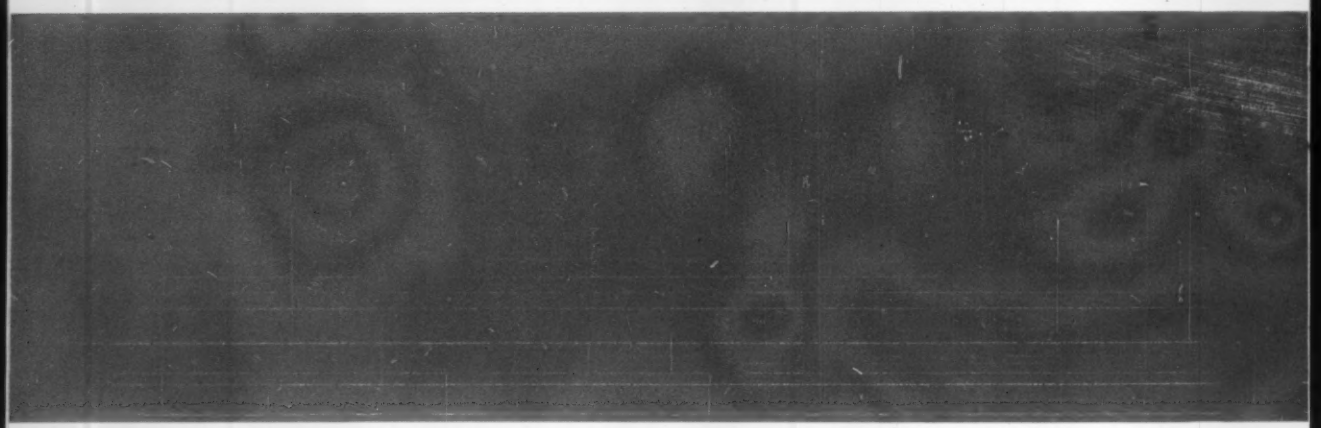
In combining amortization of capital cost with operating expense based on lower refractory cost, lower power cost, lower labor cost and equal electrode cost for the six-electrode furnaces, it is definitely indicated that two 50000 KVA six-electrode furnaces would show lower overall operating costs than three 35000 KVA three-electrode furnaces. It is entirely probable that this lower operating cost of the six-electrode furnaces could range up to $2.00 per ton of steel produced. On the basis, however, of only $1.00 per ton lower cost, there is indicated a saving of $680,000.00 per year on a yearly production of 680,000 tons. It is possible that a higher power-use factor than that previously outlined can be obtained with a six-electrode furnace. Oxygen can also be utilized. In both cases production would be increased and with increased production, greater savings would accrue.

FUTURE DESIGN OF ELECTRIC FURNACES

The six-electrode furnace that has been outlined as a 50000 KVA unit would have a nominal holding capacity of 250 tons and would use 20″ electrodes. Without modifying to any great extent the design of the present electrode system and use of power as now applied to existing three-electrode furnaces, a 300 ton 70000 KVA six-electrode furnace using 24″ electrodes could be built. It would also be possible to build a 50000 KVA approximately 250 ton holding capacity, three-electrode furnace using 30″ electrodes. In building these larger three-electrode furnaces, however, problems would be magnified relating to mechanical and electrical design, minimizing refractory losses, full utilization of power and operating difficulties. It is, therefore, definitely indicated that higher melting efficiencies and lower operating costs would be obtained with six-electrode furnaces.

CONCLUSIONS

Based on the progress of the past, there is no doubt that the production of electric furnace steel will increase at an ever expanding rate. To provide for this expansion and to produce electric furnace steel at reasonable cost, furnaces of greater capacity will be built. As higher efficiencies and resultant lower operating costs can undoubtedly be obtained with the use of large six-electrode furnaces as compared with the use of large three-electrode furnaces, the future development and use of the six-electrode furnace is to be expected.



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Progress Report

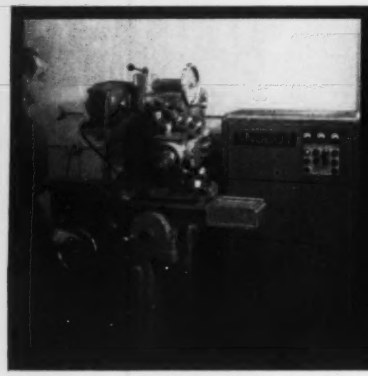
on ANOCUT.T.M. Reg. Electrolytic Machining

INDIRECT COSTS—Hidden Gold Mine

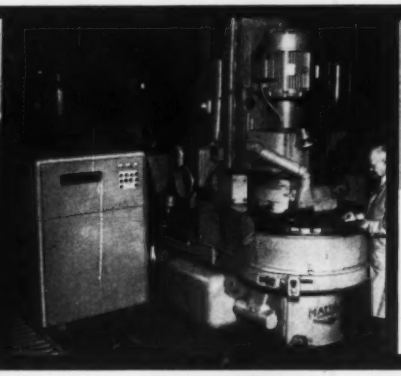
Perhaps cost reduction programs, value analysis committees and the like have placed too much emphasis on reducing unit costs by modernizing and powering up production tools. Indirect costs-factory burden, has too often been a neglected area in such studies. Labor hours spent in reconditioning tools and cutters add dollars and cents to unit costs just as truly as do those of a turret lathe operator. Yet, the equipment and techniques used in many grinding cribs today are substantially the same as 20 years ago. This heretofore neglected area must also be up-dated and made competitive, and few if any areas in a modern shop or plant offer an investment opportunity as likely to produce such dramatic dividends, a forgotten gold mine of savings.

It's easy to talk about indirect costs. Here is what Anocut is doing about them.

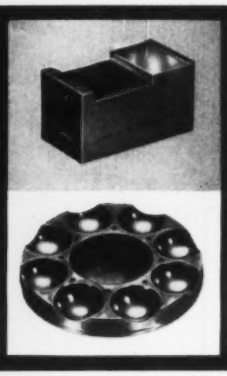
- Abrasive costs reduced 80-90 per cent.
- No rejects due to heat checks or cracks.
- Reduces consumable tool purchases.
- Broken tools and "scrap" carbide reclaimed.
- Regrind throwaways for 10% of original cost.
- Excellent finish and no saw-tooth edges.
- "Push-button" grinding.
- Make form tools from standard blanks. No premium priced preforms.
- Grind carbide and steel simultaneously.
- Faster grinding on most grades.
- One grind only. Separate roughing and finishing not required.



Regrinding carbide tipped milling cutter. Each tooth is plunge-ground on a face-type wheel to a positive stop. Cutter is then indexed and the next tooth is plunged to the same stop. Extremely low wheel wear allows cutter to be finished in one indexing, regardless of amount to be removed, resulting in substantial savings in abrasive costs and grinding time.



Single pass machining of carbide tipped milling cutter blades, removing carbide and steel simultaneously. Using Model 1500 ampere Anocut unit on Mattison vertical spindle machine, .005" to .008" of carbide is removed in a single pass. Abrasive costs are reduced 8- per cent, production increased, scrap virtually eliminated.



Slot ¼" by ¼" by .100" ground in hard carbide in one pass in 60 seconds. Electrolytic grinding offers fast, inexpensive method for bulk removal of carbide.

Eight spherical radii ground in 416 stainless piston pump part (35 R_C) 6-8 microinch finish, reducing machining time 40 per cent.

High speed steel tool. New higher powered supply units provide rapid removal and good finish on resharpening dovetail and circular form tools. Non-diamond wheel used.

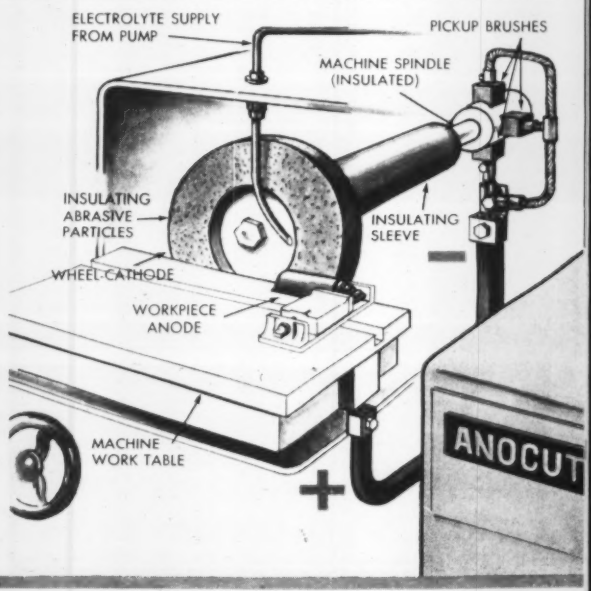
HOW IT WORKS

Electrolytic removal may be considered as the reverse of electroplating. The workpiece, which must be metallic, is made the anode in the circuit. The metal bonded abrasive grinding wheel is made the cathode. Short circuiting between the two is prevented by the protrusion of spacer abrasive particles from the surface of the wheel. A conductive water-base electrolyte fluid flows across the surface of the wheel, passing the current between the workpiece and the metal wheel. The automatically controlled direct current supplied by the Anocut unit causes the workpiece to dissolve without chips, as the abrasive particles of the wheel maintain size and finish.

Anocut Electrolytic Machining should not be confused with the spark-discharge or ultrasonic-impact methods. In the Anocut process, metal is removed by electrochemical action as in electroplating, not by arcs or sparks. The work is not immersed in oil, but is fed into the wheel just as in conventional machining.

Not magic, but an established scientific principle underlies Anocut Electrolytic Machining. The removal rate on any metal is in strict accordance with Faraday's Law, which states that the amount of metal removed is directly proportional to the number of amperes passed through the electrolyte fluid. If the number of amperes is doubled, the volume of material removed is doubled. The current which is passed is determined in large part by the area of contact between the wheel and the work. Hardness and tensile strength are not important. As a general rule, approximately .100 cubic inches of material can be removed per minute with each 1000 amperes. If 2000 amperes are passed, the removal will be doubled, to approximately .200 cubic inches. Accordingly, the wheel-work interface area should be maximized and every effort made to pass the maximum amount of current.

The electrolytic machining process, pioneered by Anocut is covered by U.S. Patent No. 2,826,540. Others pending.



From Alnico to Zircaloy . . .

Advantages and Limitations

Common soft metals, in most cases, can today be machined or ground fast and inexpensively, with no special problems. Anocut Electrolytic Machining is not recommended as a replacement for the grinding wheel or milling cutter on such jobs. But this new method of removing metal by electrolysis should be considered on any metal-removal application in which conventional methods create problems of abrasive cost, slow speed, thermal damage, burrs, layover or smear, finish, rapid tool breakdown, collapsing thin sections, maintenance of form, or size control.

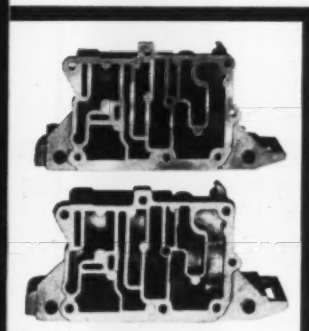
Because the bulk of the metal is removed by electric current flow you gain these advantages . . .

- Hardness or tensile strength have little effect on the removal rate.
- Wheel breakdown and abrasive cost per piece are drastically reduced.
- Unmachineable metals can be worked.
- Fragile or heat sensitive parts are machined with speed.
- Good finishes are obtained that are free of layover, smear and abrasive or cutter marks.
- Tool costs are slashed.

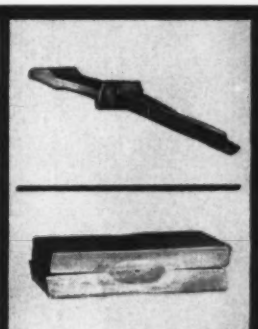
Materials from A to Z, and many having only a number, are now being machined electrolytically. Tool and design engineers more and more are specifying harder and tougher materials, knowing that a practical method is now available for working them.

The leading machine tool builders listed below have assisted Anocut in introducing this new machining concept to industry. Some have complete lines of electrolytic machines; others offer their standard equipment with the necessary alterations incorporated. Still others have designed special equipment to take full advantage of the fact that Anocut now offers as standard equipment automatically controlled electrolytic supply units with output capacities of 50 amperes to 3000 amperes. Higher capacities, up to 120,000 amperes, are available on request. Leading abrasive manufacturers have also been of tremendous help in developing diamond and non-diamond wheels for all applications, replacing milling cutters in some cases.

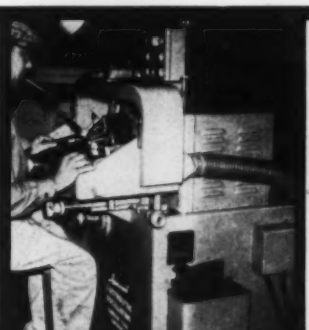
Anocut's sole business is the engineering of applications for this potent new metal removal procedure and the manufacture of electrolytic power supply units and electrolyte solutions.



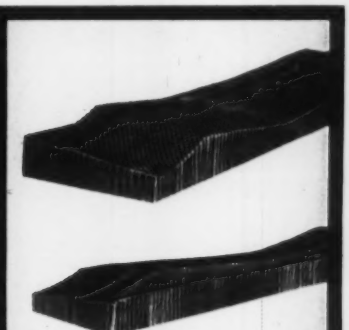
Aluminum die casting, faced against disc-type wheel to produce flat sealing surface. Raw and finished parts shown. Flatness held under .0005". Feed is .0015" per second. Current required is 1200 amperes. All edges are burr-free.



Leading and trailing edges of gas turbine bucket plunged against flat surface of disc-type wheel. An average of .100" removed in 25 seconds. No heat damage, and no burr.



Model SCE-6, one of complete line of tool grinding machines made by Hammond Machinery Builders for Anocut electrolytic grinding. Wheel oscillates, table is mounted on ball bearing ways, MistKolector is incorporated, and air feed can be used for "push button" grinding.



Compound contouring of stainless steel honeycomb is now an accomplished fact. Sample shown is absolutely burr-free. Other production installations involving flat machining of this material have been operating successfully for years.

Front interior view of Model 300, showing placement of power components, fuse cutouts, and quick demountable control chassis for automatic voltage regulation.

Spot weld inspection. Nugget and tiny hole in center clearly exposed. This job previously done by slow etching and lapping procedure. Now done on Anocut Model 300 and face type wheel.

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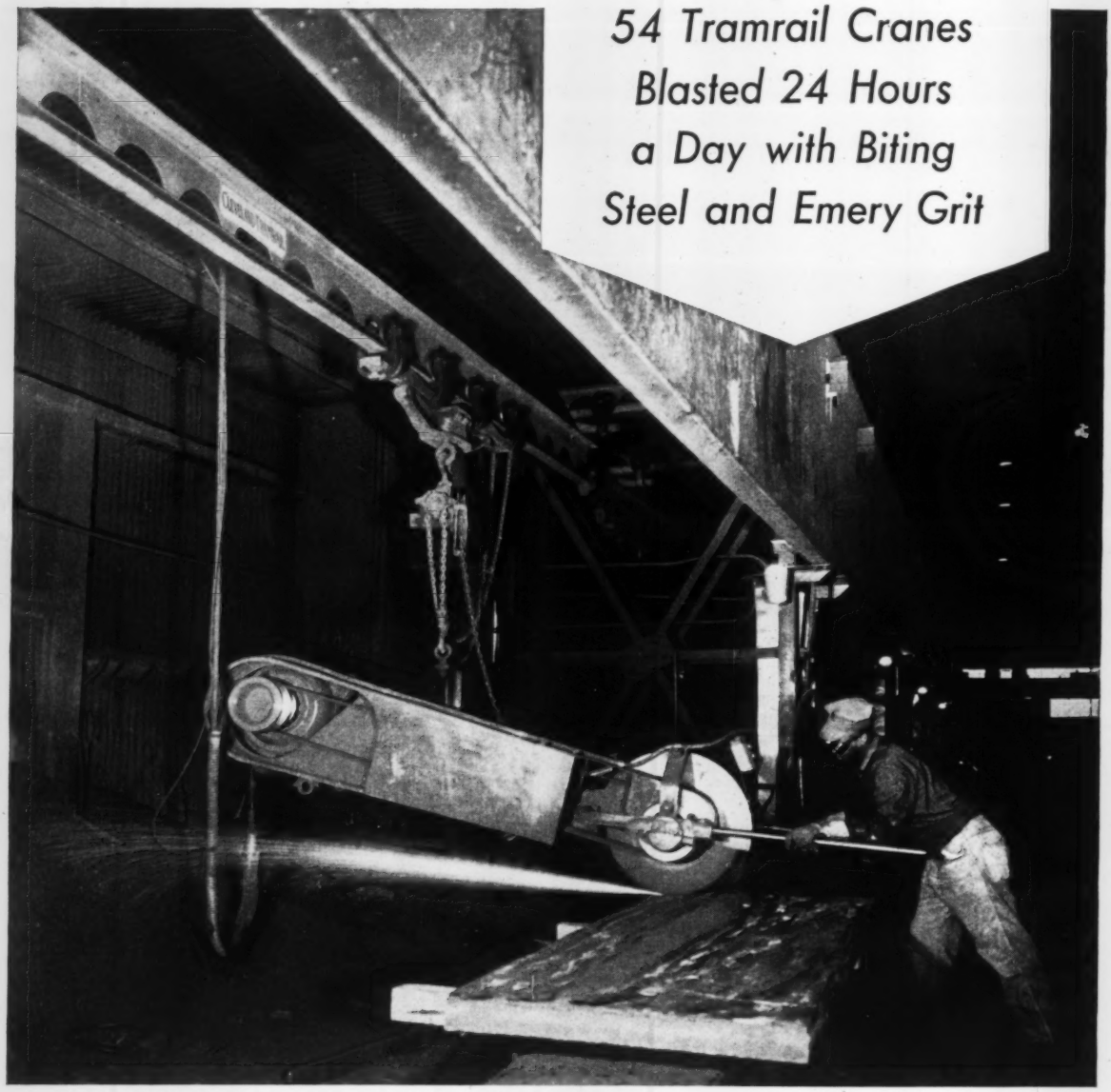
Talk About *Tough* Working Conditions



54 Tramrail Cranes Blasted 24 Hours a Day with Biting Steel and Emery Grit

FOR years Cleveland Tramrail cranes have been handling swing grinders at a large Pennsylvania steel mill.

Despite the continuous storms of fine, penetrating, corrosive dust, the cranes operate with negligible maintenance.

The design and quality of Cleveland Tramrail equipment is of importance for every job, but on the tough ones like this is where these factors quickly prove their worth.

Cleveland Tramrail cranes are particularly well suited for swing grinder operation because of their free easy movement in any direction. This permits flat grinding over a wide area and avoids "dishing" of grinder wheel into the metal. Easy crane operation greatly reduces worker fatigue.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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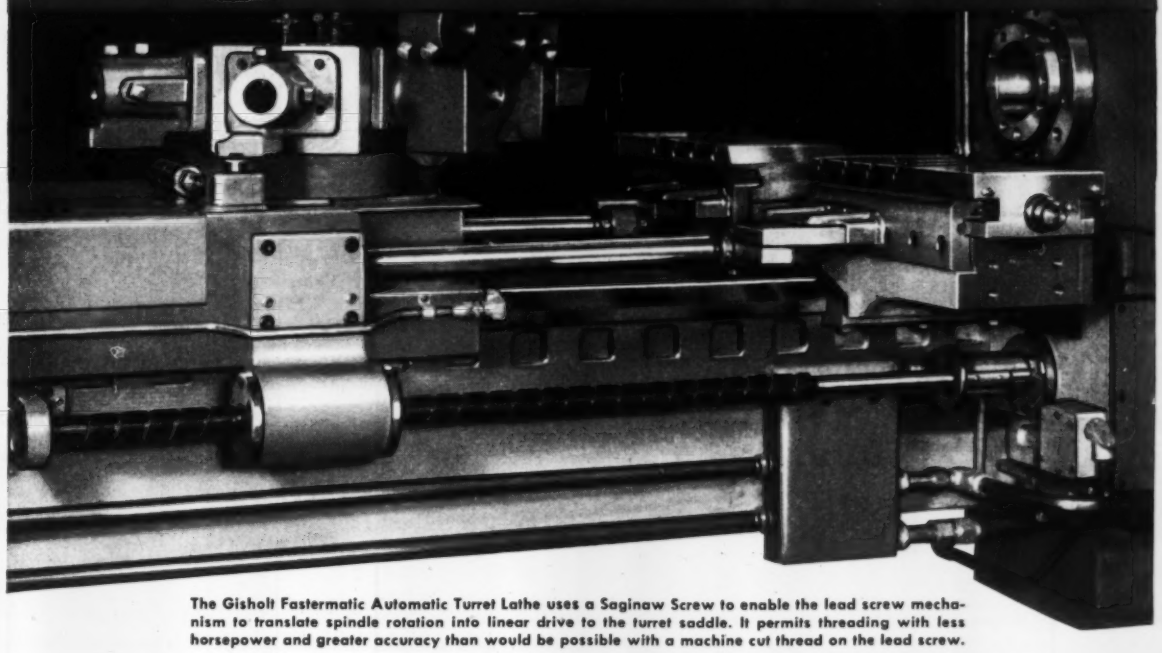
GISHOLT CO. CUTS PRODUCTION COSTS WITH THE Saginaw b/b Screw

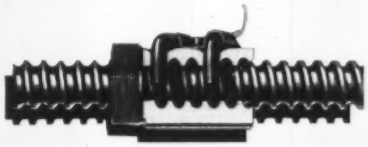


The Gisholt Fastermatic Automatic Turret Lathe uses a Saginaw Screw to enable the lead screw mechanism to translate spindle rotation into linear drive to the turret saddle. It permits threading with less horsepower and greater accuracy than would be possible with a machine cut thread on the lead screw.

"BECAUSE CRITICAL PRECISION IS BUILT INTO EVERY SAGINAW SCREW, it's saved us money by cutting out an extra production cost on the threading attachment of our Fastermatic Automatic Turret Lathe. Without the Saginaw Ball Bearing Screw we would have to pay a considerable premium for acme screws machined to less than standard limits. Now the Saginaw Screw gives our product greater accuracy and longer life with less friction . . . and much greater **S**ales **A**ppeal as well," *says Mr. A. A. Ebel, Advertising Manager, Gisholt Machine Company, Madison, Wisconsin.*

The Saginaw Ball Bearing Screw converts *rotary* motion into *linear* motion with over 90% efficiency. So save time, power, weight, space and cost by switching to these versatile Saginaw Screws.

Perhaps the Saginaw Screw can give *your* products that greater **S**ales **A**ppeal you're looking for. For the detailed story, write or telephone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan—*world's largest producers of b/b screws and splines.*



Give your products NEW SALES APPEAL... switch to the Saginaw ball bearing Screw

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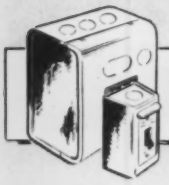
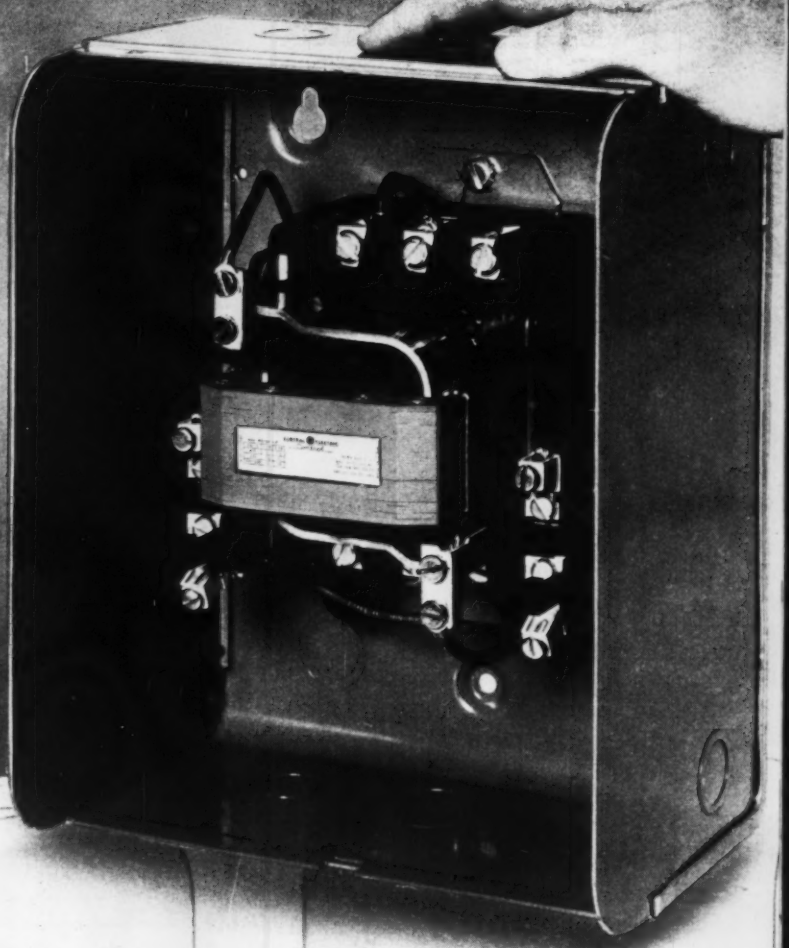
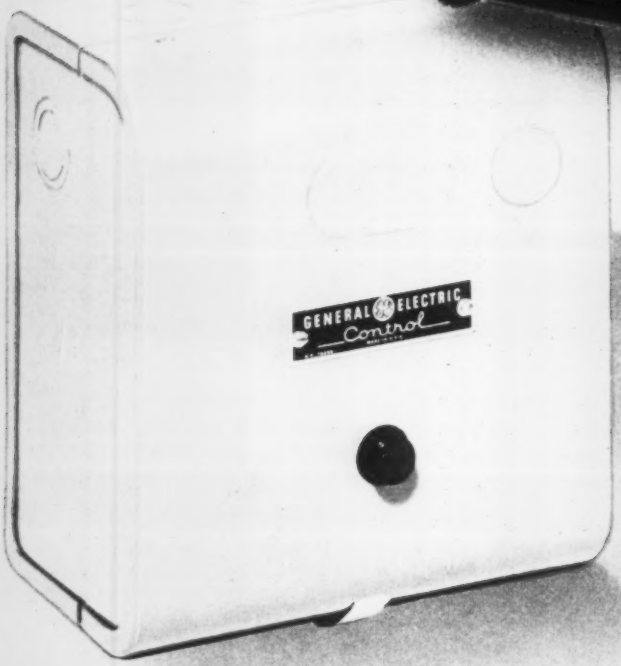
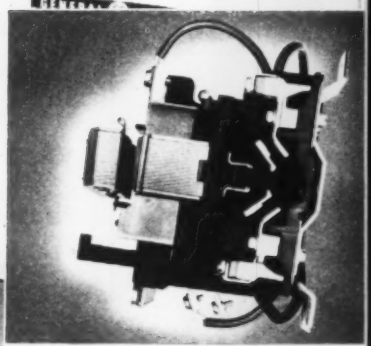
NOW AVAILABLE IN GENERAL ELECTRIC'S



100 LINE







WEDGE-ACTION DESIGN (see cross-section cutaway) gives positive "make." A quick, clean "break" is assured by spring-loaded contacts and a low-stress "kick-off" spring.

FIELD-PROVED 100-LINE DESIGN . . .

NEW SIZE 2 MAGNETIC STARTER

General Electric now offers a Size 2 magnetic starter that is 34% smaller than previous open forms, and includes all the field-proved features of General Electric's 100-Line. You get better performance, less maintenance and greater dependability because:

WEDGE-ACTION CONTACTS provide more positive "make". Reduced armature mass and spring-loaded contacts practically eliminate bounce. Contact springs and a special "kick-off" spring provide positive "break". Vertical contacts shrug off dirt and dust.

NEW ARC TRAP DESIGN actually attracts arcs away from contacts and dissipates them harmlessly to prolong contact life.

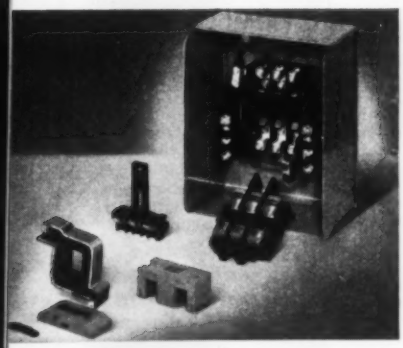
SNAP-SLIDE CONSTRUCTION makes possible complete disassembly of the starter in 20 seconds. Contacts can be removed and inspected in ten seconds.

STRAIGHT-THROUGH WIRING means no wires need be bent or looped, and all wiring is done from the front. Pressure-type terminals and 10% more wiring room speed installation.

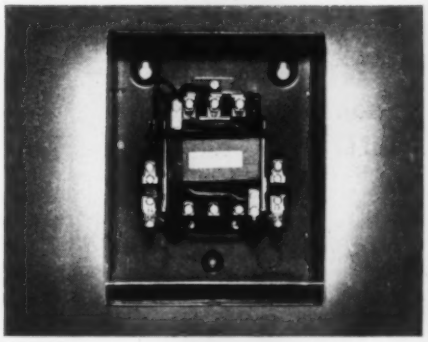
For more information, contact your nearest General Electric Apparatus Sales Office or Distributor, or write Section 733-45, General Electric Co., Schenectady, N. Y. (Ask for Bulletin GEA-6917.)

RUGGED DEPENDABILITY of new General Electric Size 2 starter is proved by severe plugging-duty torture test.

GENERAL ELECTRIC



SNAP-SLIDE CONSTRUCTION permits complete starter disassembly in 20 seconds without tools. All operating parts either snap or slide together for maximum accessibility.



10% MORE WIRING ROOM makes the new Size 2 starter easier to wire, even though it is 14% smaller than previous enclosed forms. Wrap-around cover adds extra accessibility.

STRAIGHT-THROUGH WIRING with line terminals on top and load terminals on bottom saves wiring time. All wiring is done from front, and no wires need be bent or looped.

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CLASS SMGL combination chains are designed specifically for furnace conveyor service. Sidebars and center links are made of "file-hard" Promal, with bosses on sidebars to reduce stress on free-floating pins. CLASS 1100 roller chain is ideal for horizontal or inclined rolling elevators and conveyors.

Full design information on both is contained in Catalog 1050. Your Link-Belt representative will counsel on chain selection for high temperature conditions.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

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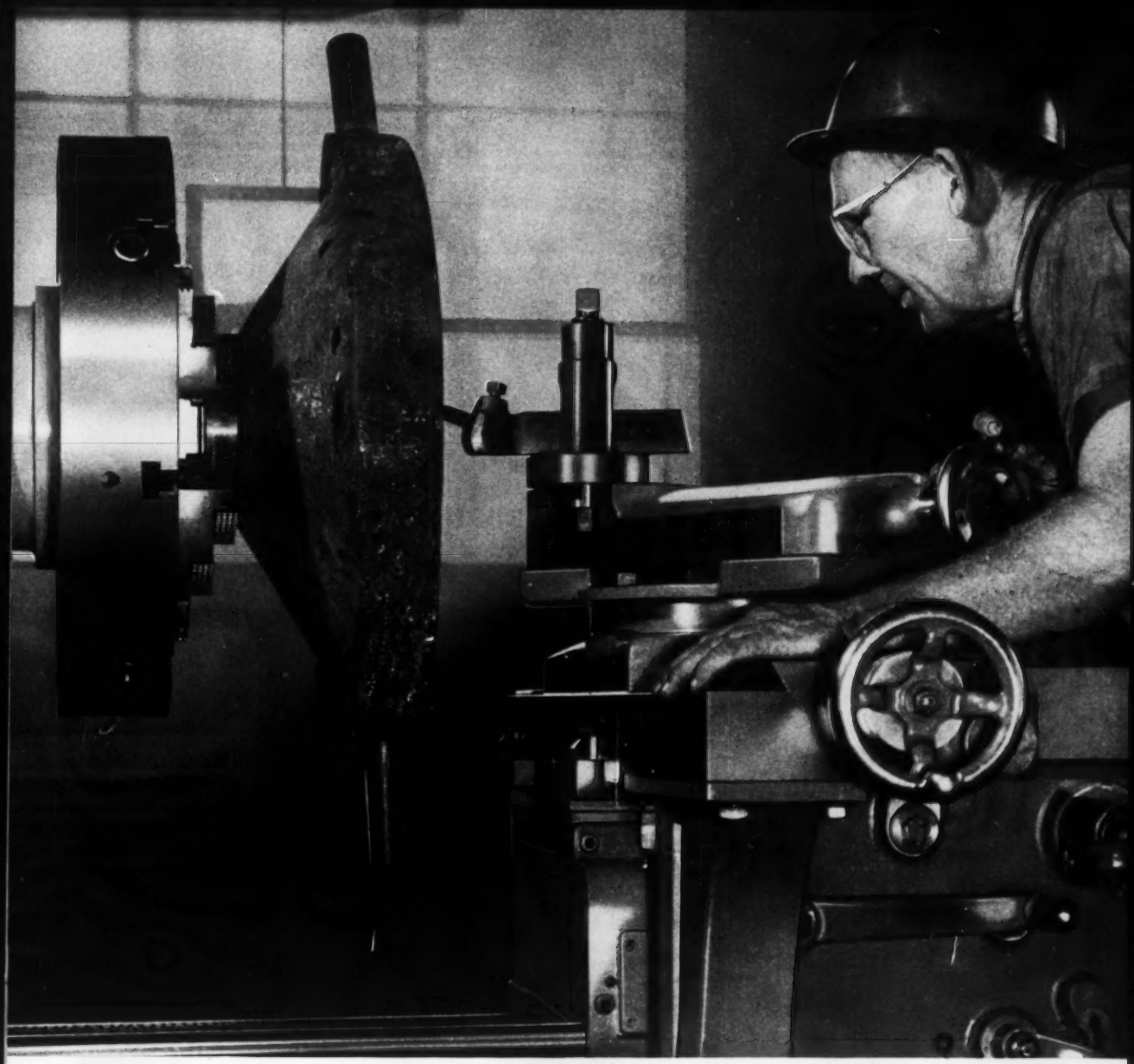


Operator machines $1200 oblique-shaped, 31" diameter cross-head plate on Nebel extension bed gap lathe in half the usual time.

Odd shapes to 40" dia. machined to .0004" in ½ time on NEBEL extension bed gap lathe

The Port Arthur, Texas plant of Koppers Co., Inc., works with flammable gas under high pressures. Equipment maintenance demands perfect machining, with accuracy to four ten thousandths inches. The firm installed a Nebel extension bed gap lathe to obtain this precision, plus the extreme versatility necessary to swing large, odd-shaped parts.

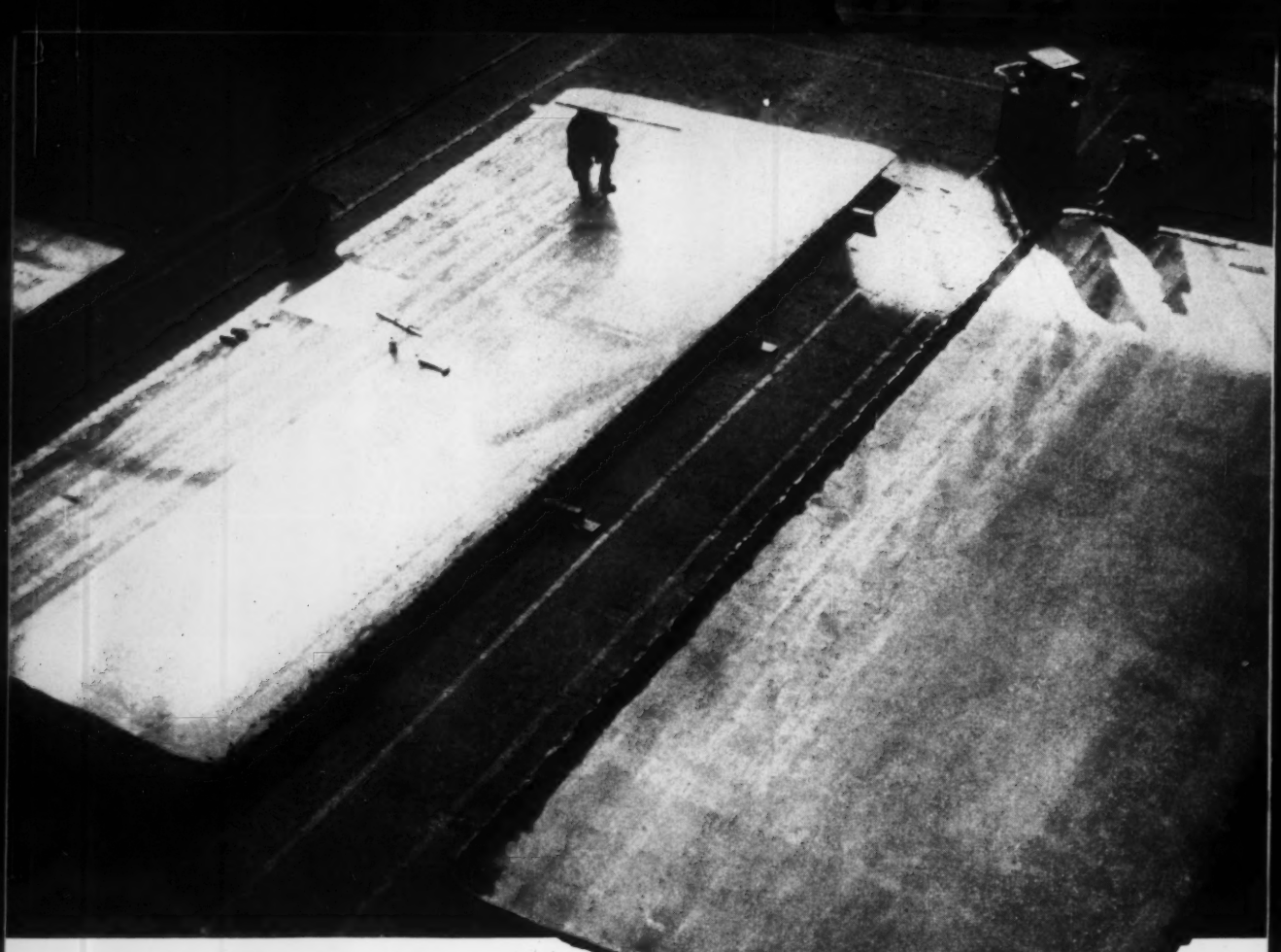
The 28"/50" Nebel, with its 120" centers, 52" swing through the gap, and load-carrying capacity of over 37,000 pounds, satisfies Koppers' need for a "universal" unit. It has eliminated "shut-down time" in production, machining overnight pieces that previously required weeks of delay for replacement, being impossible to chuck or face on an ordinary lathe. Often, the machine "doubles" as an engine lathe.

Set up and geared for metric threading, ranging from 1.75 to 80 threads per mm., offering a precision impossible and impractical with competitive machines, the Nebel cuts machining time in half on most jobs, including the numerous special alloys used by Koppers.

Learn how the incomparable accuracy and flexibility of a Nebel extension bed gap lathe can save you time, money and space. Write for free detailed bulletins on the complete line today!

NEBEL LATHES

Nebel Machine Tool Corporation
3405 Central Parkway, Cincinnati 25, Ohio



colossus in stainless

...world's largest stainless steel plates ready for processing at Carlson

SOMETIMES Carlson service is a cooperative venture that gets practically impossible jobs done. The processing and finishing of these, the world's largest stainless steel plates, is an example of such teamwork.

As this was a "first time" job, the most careful planning and coordination had to be exercised. Oversize ingot molds and a 70-ton capacity furnace had to be used. It took the country's largest plate mill to roll the ingots to slabs, the slabs to plates. The finished plates, cut-to-shape by Carlson specialists, met every customer requirement.

These huge plates, of Type 304 stainless steel, were made to Specification A-240 Grade S (ASTM A240-T). Each plate weighed over 49,000 pounds; one measured 461″ x 179″ x 2″; the other 451″ x 184″ x 2″. Destined for a nuclear application, these plates were flame-cut and abrasive-cut to make two half-circles. The entire order totaled nearly 100,000 pounds.

Cooperation made this "colossus" a success—cooperation under the knowing eyes of Carlson specialists. This same team is ready to work on your order. We invite you to write, wire or phone for further information.

G.O.CARLSON Inc.

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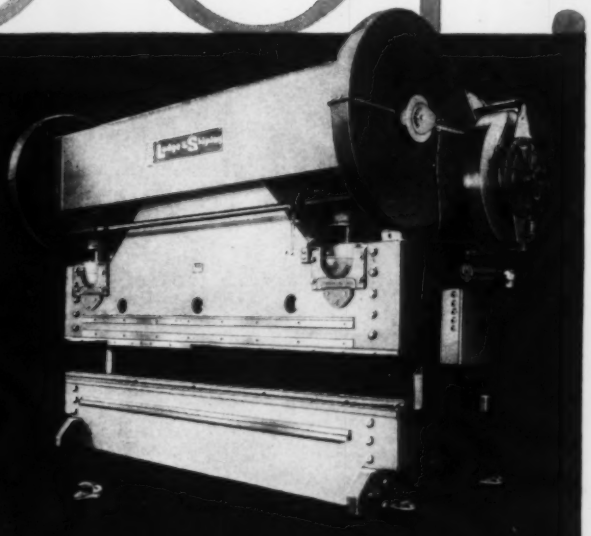
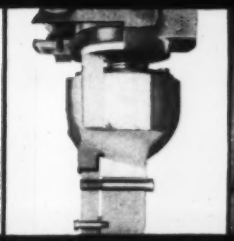
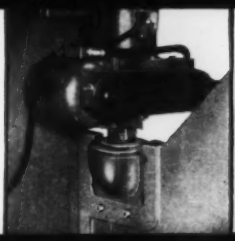


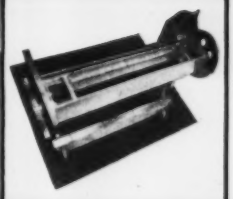
AIR CLUTCH AND BRAKE . . . sensitive, smooth acting and trouble-free — needs no adjustment throughout its life.



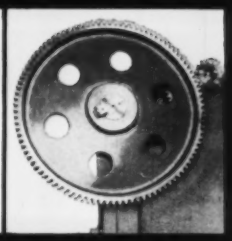
RAM PRESSURE RELEASE . . . exclusive design saves time, dies and machine; operates quickly and easily.



MICRO-RAM ADJUSTMENT . . . push button, direct reading adjustment — includes declutch for adjusting out of parallel.



SOLID STEEL FRAME . . . exceptional rigidity, even at full capacity — two bearings on each eccentric for long life.



EXTRA RUGGED DRIVE . . . spur gearing for efficiency — runs in oil; two-speed drive available at extra cost.

Compare the Lodge & Shipley Press Brake against any other standard equipped brake. You'll pay extra for item after item in the list above. The Lodge & Shipley Press Brake is fully equipped for fast, accurate, versatile and dependable operation. In a few words . . . you *pay no more, get lots more* . . . in a Lodge & Shipley Press Brake.

Want complete details? Write for Condensed Catalog PB-8 or mention capacity requirements for specific literature and data.

SEE OUR CATALOG IN SWEET'S

Lodge & Shipley

THE LODGE & SHIPLEY CO., 3070 COLERAIN AVE., CINCINNATI 25, OHIO

For the best Jib Crane VALUE...

Get Borg-Warner QUALITY and PERFORMANCE

FULL 360° ROTATION

N-PBM

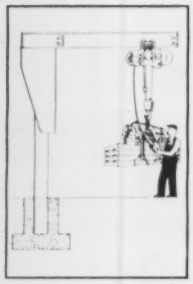
Jib Master

$495.00

for a 1-Ton, 10 Ft. Span, 10 Ft. Under Boom Pillar Base Mounted Jib Crane with all these superior features:

MAXIMUM COVERAGE

1. Head assembly pivots on heavy-duty tapered roller bearing.
2. Head assembly accurately positioned and welded for perfect alignment of jib. Heavy side plates.
3. Two large-diameter, carefully machined side rollers, each with two precision ball bearings for smooth jib rotation.
4. Heavy wall seamless steel pillar.
5. Heavy circular base plate, 6 large gussets and pillar welded together to form a rigid frame.



The Jib Master is also available with Pillar Foundation Mounting, designated N-PFM. Either model can be used with chain block or electric hoist.

Mass-production economies put Jib Master way out front in performance and value . . . and at a price you can afford.

Entirely self-supported, Jib Master swings freely through a full 360° for efficient hook coverage over the maximum work area. Two bottom load carrying rollers, each have two heavy duty precision ball bearings. The top thrust bearing is a heavy duty tapered roller bearing. Heavy side plates are welded to head assembly for perfect alignment of jib. Six large gussets form a rigid all welded unit with pillar and heavy steel base plate.

Whatever your overhead materials handling requirements, it will pay you to write for full details and prices today or call your local B-W Industrial Cranes distributor.

Industrial CRANES — INGERSOLL PRODUCTS — B-W — BORG-WARNER

Design it better . . .
Make it better.

Find Your Nearest Distributor Under CRANES in The Yellow Pages

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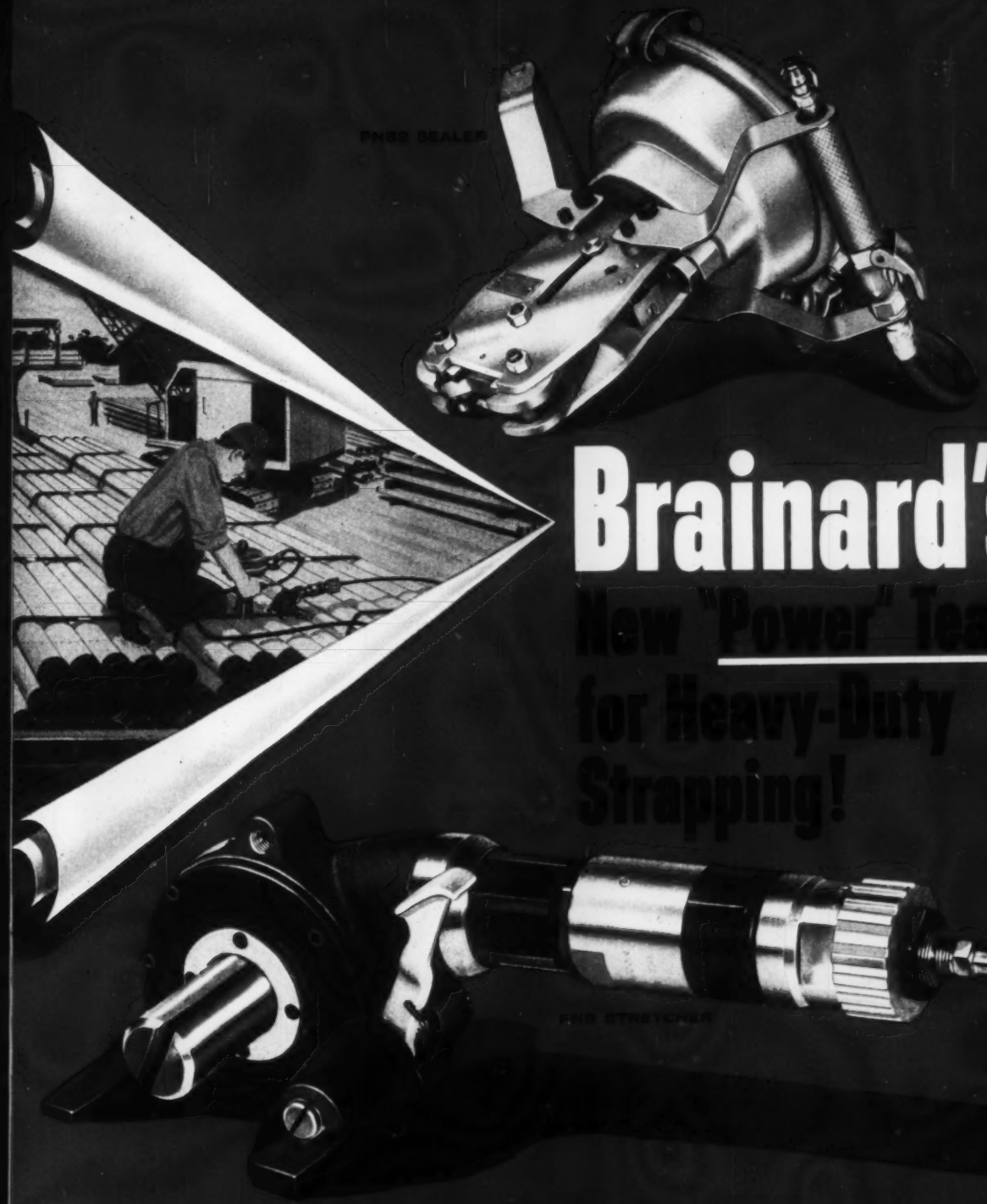


Brainard's New "Power" Team for Heavy-Duty Strapping!

Two more new heavy-duty power tools added to Brainard's rapidly growing strapping system—the exclusive PNB stretcher and the PNB2 sealer—give even more cost-cutting advantages to heavy-duty strapping users everywhere.

The PNB pneumatic stretcher permits quick tensioning—automatically—and maintains it. Then the PNB2 pneumatic sealer, with a simple press of the thumb, gives a strong, safe, lasting seal.

Both tools working as a team assure you of fast, efficient heavy-duty strapping on 2" x .050 size on many types of carloading and packaging. Particularly adaptable to carloading of pipe as illustrated.

Why continue with obsolete, time-consuming equipment? Get in touch with your Brainard representative for details and prices.

BRAINARD Safe-Ty **STRAPPING**

DIVISION OF SHARON STEEL CORP., WARREN, OHIO

There is a Threading Specialist IN YOUR SHOP

He is your Landis Service Representative. Although not in your plant every minute of every day, a phone call or wire will bring him to you promptly. Down time, improper chaser life, failure to meet specifications . . . these are the types of problems your Landis Service Man helps you to avoid.

These Service Representatives, located throughout the country, can help you in many ways. For example, they can show you how to best use your threading equipment (whether the operation is by cutting, grinding, tapping, or rolling) to save you time and money. They will aid in translating the general sales literature data into specific information on producing your particular threading job. They can describe the special equipment that has been designed for threading unusual and difficult-to-handle workpieces. By working with our Engineering Department, they are able to provide additional information on similar equipment for your special threading requirements. These are but a few of the many ways the Landis Service Representative can help you.

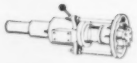
All LANDIS Equipment is guaranteed to produce threads to meet the degree of accuracy and production for which it is sold. Our extensive staff of Service Men, plus the above guarantee, emphasize the value LANDIS assigns to satisfied customers. We sell performance, not just products, and you become an expert on threading, when our experienced Service Representatives are at your service.

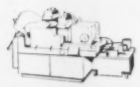
LANDIS *Machine* COMPANY WAYNESBORO • PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

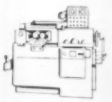
Threading Machines

Die Heads—Rotary & Stationary


Taps—Collapsible & Solid Adjustable


Centerless Thread Grinding Machines

Thread Rolling Tools


Thread Rolling Machines

LANDMACO

Torque-Arm

THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION

America's Most Complete Line of Shaft Mounted Speed Reducers

55 MODELS

- 1 to 200 hp. at 100 rpm!
- Output speeds from 10 to 378 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 150 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 4400 Union, Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

Here is one of a fleet of forty Type 430 Stainless Steel tank cars that transport nitric acid. Built in 1956 by General American Transportation Corporation, these tank cars are still in excellent condition.

Leading the pure life—in USS Stainless Steel

A manufacturer's *second* biggest disappointment is to have his product rejected because it was contaminated during shipment. The *biggest* disappointment comes when the customer buys his next order from someone else.

Manufacturers who ship or contain their products in Stainless Steel seldom worry about product purity. Many chemicals that eat away other metals have no effect on Stainless Steel. It keeps a smooth, dense surface that is easy to clean. No corrosion. No pits. No place for dirt to hide. And there's less danger of spoiling one batch with residue from another.

Because Stainless Steel is so strong, it can be used in thinner, lighter gages—reducing the overall weight of the container. But the real clincher is this: even though Stainless Steel costs more, there is no cheaper material in the long run. Specify USS Stainless Steel . . . through our nearest sales office or your local Steel Service Center.

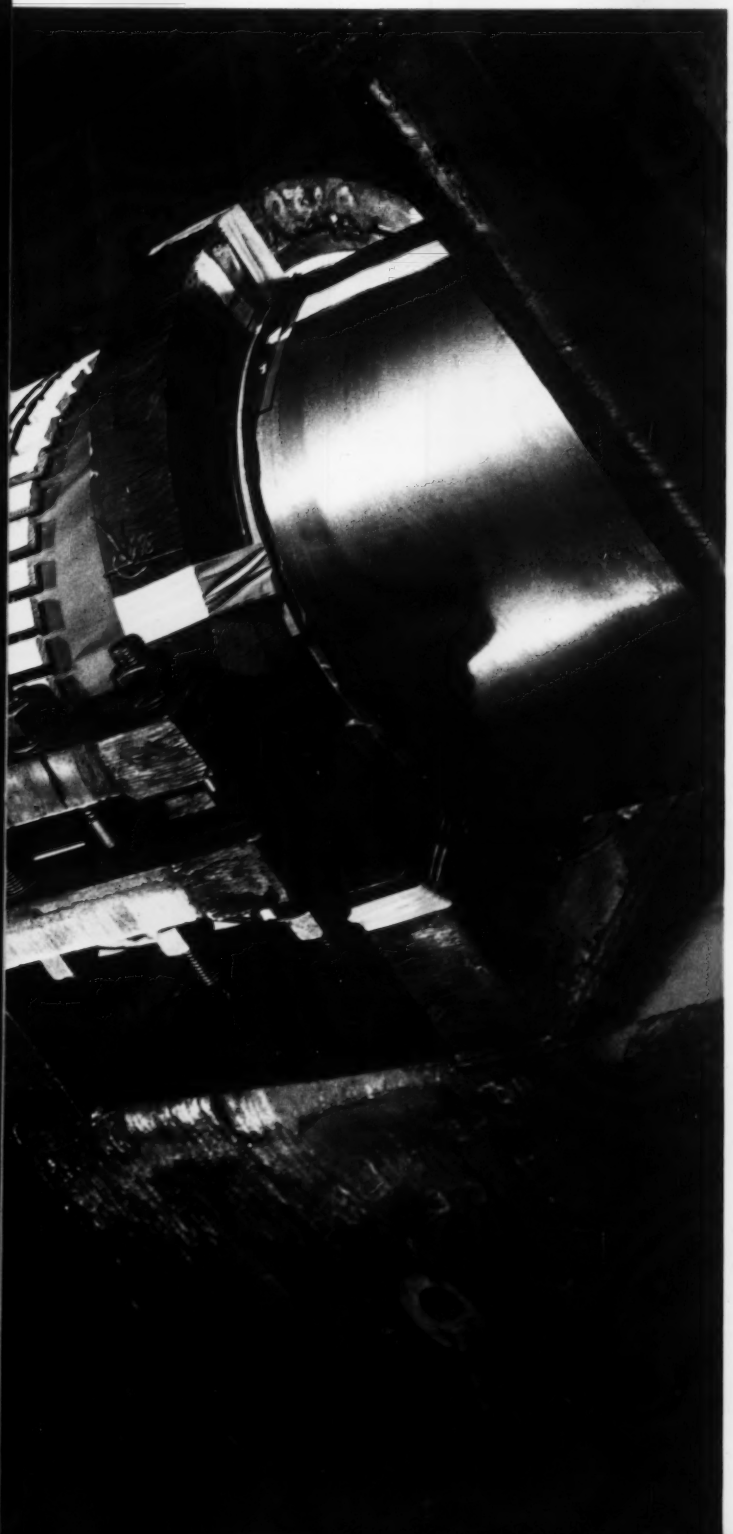
USS is a registered trademark

United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS **United States Steel**

"60 tons of counterweights de-shimmied this shaft"

says A. H. McGurk, USS Machine Shop Foreman



Arthur H. McGurk has supervised a lot of uncommon machining jobs during his 30 years in the Forgings Division of U. S. Steel. But even he talks about this one:

It's a 30-ton single throw crankshaft for a vertical extrusion press. The German company making the press says that it's the biggest one-piece crankshaft of its kind ever made—more than 15′ long and almost 36″ in diameter at the main bearing journals. The "throw" section is about 31″ deep, and here, the crankpin journal is *42″ in diameter*.

We forged and machined this unusual shape from *one piece of steel*—a 110″ diam.-476,000# ingot of Ni-Cr-Mo-V steel that was double normalized and tempered to develop a tensile strength level of 120,000 psi. When the smooth-forged shaft was ready for machining on a 120″ lathe it weighed 72 tons, and it created a real problem. As it stood, the forging couldn't be turned on the lathe because the heavy throw section was off-center from the line of the main shaft. This eccentricity would tear the shaft from the lathe.

The problem was solved with three specially designed counterweights that totaled 60 tons. Collars were welded to the weights and they were bolted to the shaft so that it could be turned on either of its two centers without any whip. On a lathe and a planer-miller, the shaft was machined to tolerances of .001″.

Bearing surfaces were polished to a 63-microinch finish.

The rest of the machinery for this extrusion press was made in Germany, but U. S. Steel received the order for the crankshaft because the forging and machining demanded equipment and know-how that can't be matched anywhere else in the world. We'd appreciate your inquiries or requests for our free 32-page booklet about USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

USS "T-1" Steel can be flame cut, welded, formed, sheared, punched, machined or forged.

How to **beef-up** your equipment without adding fat

Build it stronger, tougher and lighter with USS "T-1" Steel. This remarkable steel was developed especially to meet the needs for bigger tools, stronger equipment, larger yet less massive structures.

USS "T-1" Steel is a low carbon, quenched and tempered constructional alloy steel combining weldability and formability with exceptional strength and toughness. Because of its high yield strength (100,000 psi minimum) you can cut weight safely—in actual applications, as much as 25% to 50% weight reductions have been achieved.

Total costs can frequently be reduced, too. In applications such as heavy machinery, rotating parts, pressure vessels and bridge members, steel costs can be lowered by reduction in cross section and substantial savings experienced in welding, maintenance, freight and erection costs.

Also, in equipment subjected to impact abrasion, USS "T-1" Steel pays off. Users report service life increases ranging from 25% to 100%—or more. Power shovel buckets, bulldozer blades, coal and ore bins . . . all cost less in the end when made of "T-1" Steel because they last longer, cost less to maintain.

Write for free book. The many advantages, applications and cost-saving features of this versatile steel are completely described in our book USS "T-1." United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and "T-1" are registered trademarks

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
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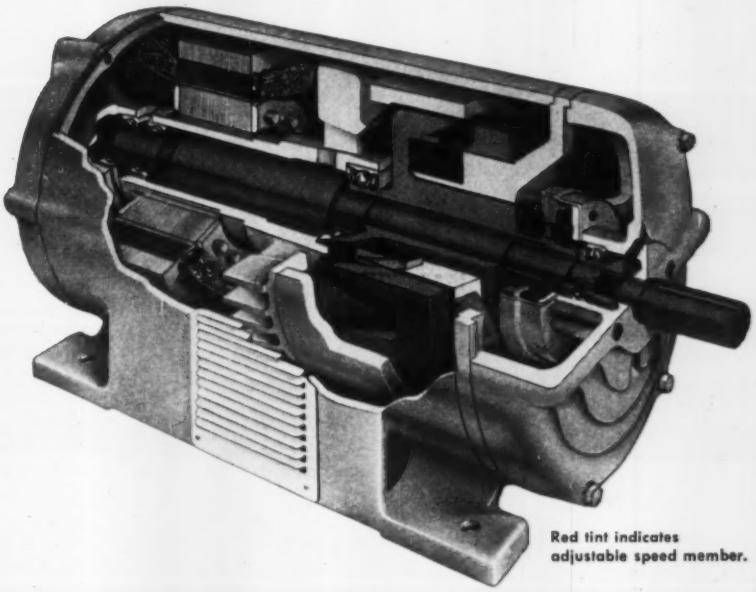
USS **United States Steel**

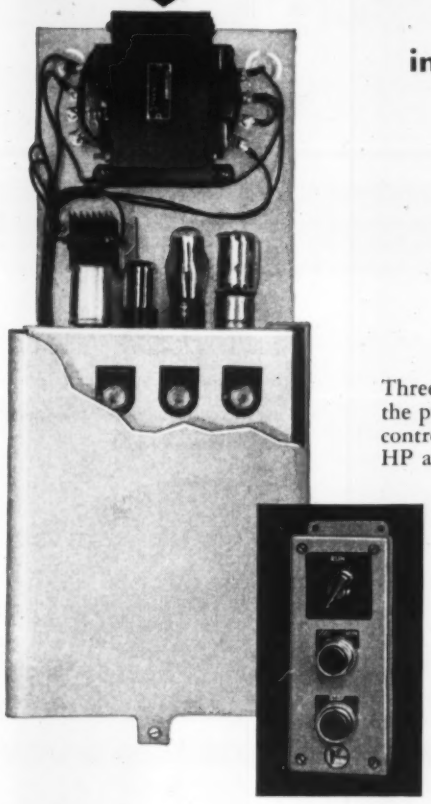
THIS NEW QUILL-TYPE AJUSTO-SPEDE® DRIVE

Plus

THIS NEW K-2 CONTROL and PUSH-BUTTON STATION



Red tint indicates adjustable speed member.



Give You Controlled Adjustable Speed from an AC Power Source

in a Compact, Low Cost 3-Unit Drive Package by

DYNAMATIC®

PIONEER IN EDDY-CURRENT EQUIPMENT

Three compact components, the Ajusto-Spede Drive, the K-2 Control, and the push-button station make up this complete drive package which provides controlled adjustable speeds for any application from ½ HP through 7½ HP at 1800 RPM.

Remote wall mounting of the control panel conserves space on the driven machine; the push-button station places vital controls at the operator's finger tips.

Standard control features include on-off clutch control, infinite speed adjustment, constant speed regulation, and jogging. Any of a variety of special features may be easily and economically added to the standard control by the installation of a single resin-encapsulated circuit.

Send for complete information covering design and operation of the new models ACM-903 and 904 Ajusto-Spede Drives. Read how the new K-2 Control provides infinite speed adjustment, on-off clutch control, constant speed control, jogging, threading, cascading, and acceleration control.

Our New Bulletin K-2-159 is Now Available.

EATON®

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DYNAMATIC DIVISION

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Specify SANDVIK *Precision-Tailored* Spring Steel

FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

SS-138

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels —

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered — scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

NEW, FREE BROCHURE

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.

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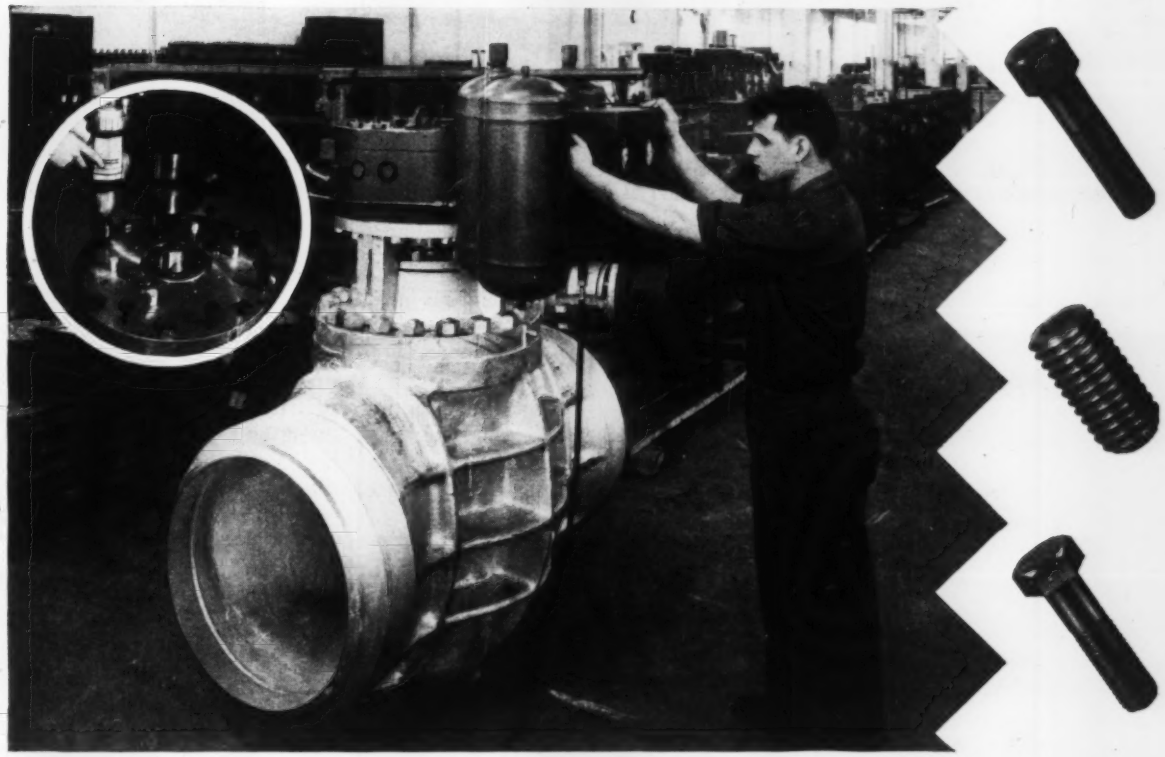
Sandvik Quality Steels

IT PAYS TO STANDARDIZE ON **STANSCREW**



Stanscrew service adds strength, lowers costs for Shafer Valve Company

The valve operators produced by Shafer Valve Company of Mansfield, Ohio are used to open and close large valves on gas pipe lines . . . often in remote locations, many miles from human supervision. They are subject to sudden surge loads which cause extremely high stresses . . . and their critical importance demands unfailing reliability of all components.

Shafer formerly manufactured their own fasteners for this demanding application from a special high strength steel. Then their distributor arranged for a visit from Stanscrew's fastener specialist. He quickly established that Stanscrew's heat-treated "Carbon Restoration" cap screws, correctly applied, could provide even greater fastener strength . . . and at a significant saving in cost.

The Stanscrew fastener specialist may be able to make similar savings or improvements in your assembly operations. For he brings to your application the experience and facilities which have made Stanscrew a leading supplier of fasteners to the top names in American industry for over 80 years. And he can select money-saving answers to your problems from a complete line of over 5,000 different types and sizes of standard fasteners . . . always in stock, quickly available.

Whatever your fastener requirements, call your nearby Stanscrew distributor today. He will arrange for a prompt visit from the Stanscrew fastener specialist.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

Allen Hughes cut abrasive costs 18 to 1 at

Grinding the gripper-die marks off a jet turbine blade can be an expensive business. At the Harrisburg Works of Thompson Ramo Wooldridge, these super-alloy steel blades used to be semi-finished with coated abrasive belts until Industrial and Abrasive Control Engineer Paul Mazich started checking up on costs.

Mazich called in Bay State Abrasive Engineer Allen B. Hughes and he dug into the problem. Working with Bay State distributor General Machinery & Equipment Company, Hughes made a series of careful tests. The result was a grinding wheel that cut the annual cost of abrasive materials alone from $18,000 to $1,000. Its unique combination of special bond and abrasive grit increased cutting spread, prevented loading and eliminated the need for dressing so successfully that productivity rose, labor costs dropped and there were additional savings of around $5,000.

Like Allen Hughes, the Bay State Abrasive Engineer in your area is a trained expert. He backs up the work of the experienced men who represent Bay State's topflight distributors and Bay State's research labs back them both with new ideas, techniques and materials. *Better grinding at lower cost . . . that is our business.*

Industrial Engineer Paul Mazich examines finish on jet engine blade forging after off-hand grinding operation illustrated at right.

Operator E. S. Jones semi-finishes jet turbine blade in off-hand grinding operation with cool-cutting, self-dressing Bay State grinding wheel.

Thompson Ramo Wooldridge

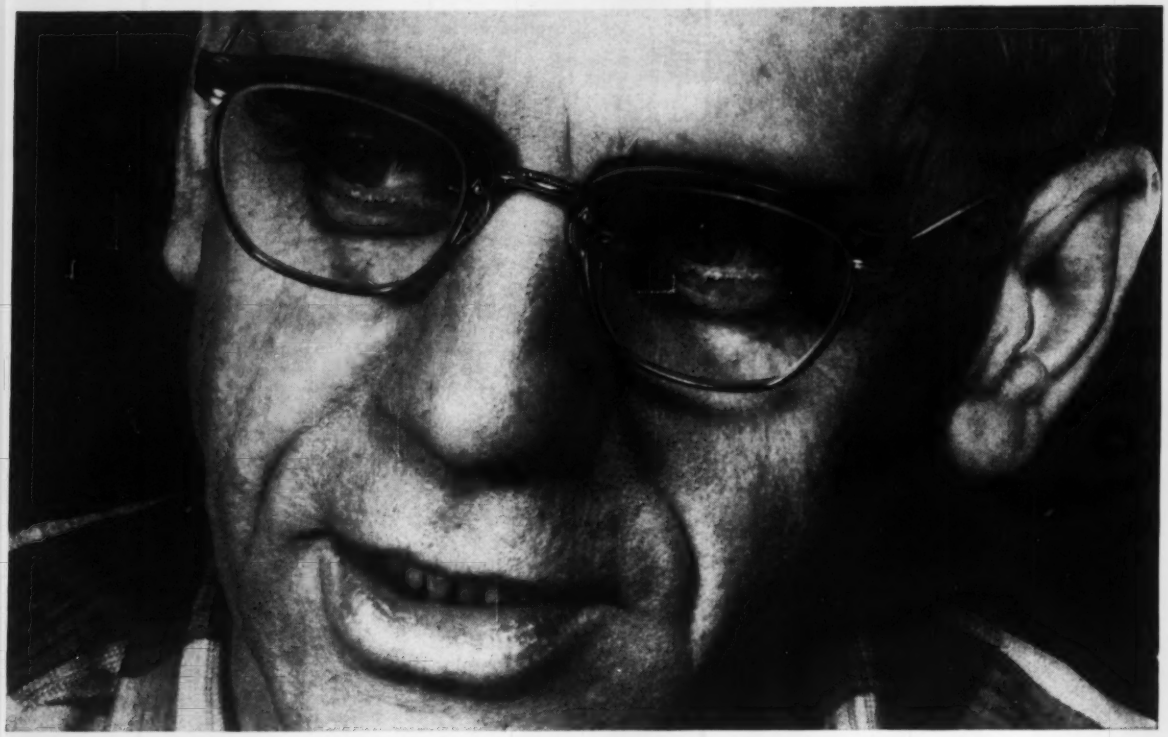
Allen B. Hughes worked up through Bay State's Westboro plant and then added extensive field experience so that his knowledge of abrasive problems and practical solutions for them covers every phase of abrasive engineering.

BAY STATE ABRASIVES

BAY STATE
WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh, Los Angeles. *Distributors:* All principal cities.

Here's Eye Protection and Correction (℞) in 3 Eye Appealing Series



How (℞) Safety Glasses like these Can Pay for Themselves in Six Months

These are the modern types of safety prescription glasses that workers wear willingly. Combining smart appearance with SAFETY STANDARD FRAMES AND LENSES, they provide the basic ingredients for an ℞ program. By guarding against accidents they save eyes—and compensation in four and five figures. In indirect costs, they save about four times as much as in direct costs. In many cases, they pay for themselves in 6 months or less. Specify them for Safety Prescription. Your workers deserve the best!

"SAFEMASTER" is American Optical's latest. Virile good looks! Frame is high quality nickel. Trim is durable nonflammable plastic—minimizes glare-reflection. Every frame must pass *3* National Bureau of Standards tests (Cat. No. F5200).

"2-TONE." Another handsome, late model addition to AO's line of Ultrascopic safety glasses. Onyx on crystal acetate (Cat. No. F9700).

Ultrascopic in Pink Crystal or our very new Mahogany frame. (Cat. Nos. F9500—Pink Crystal, F9500M—Mahogany).

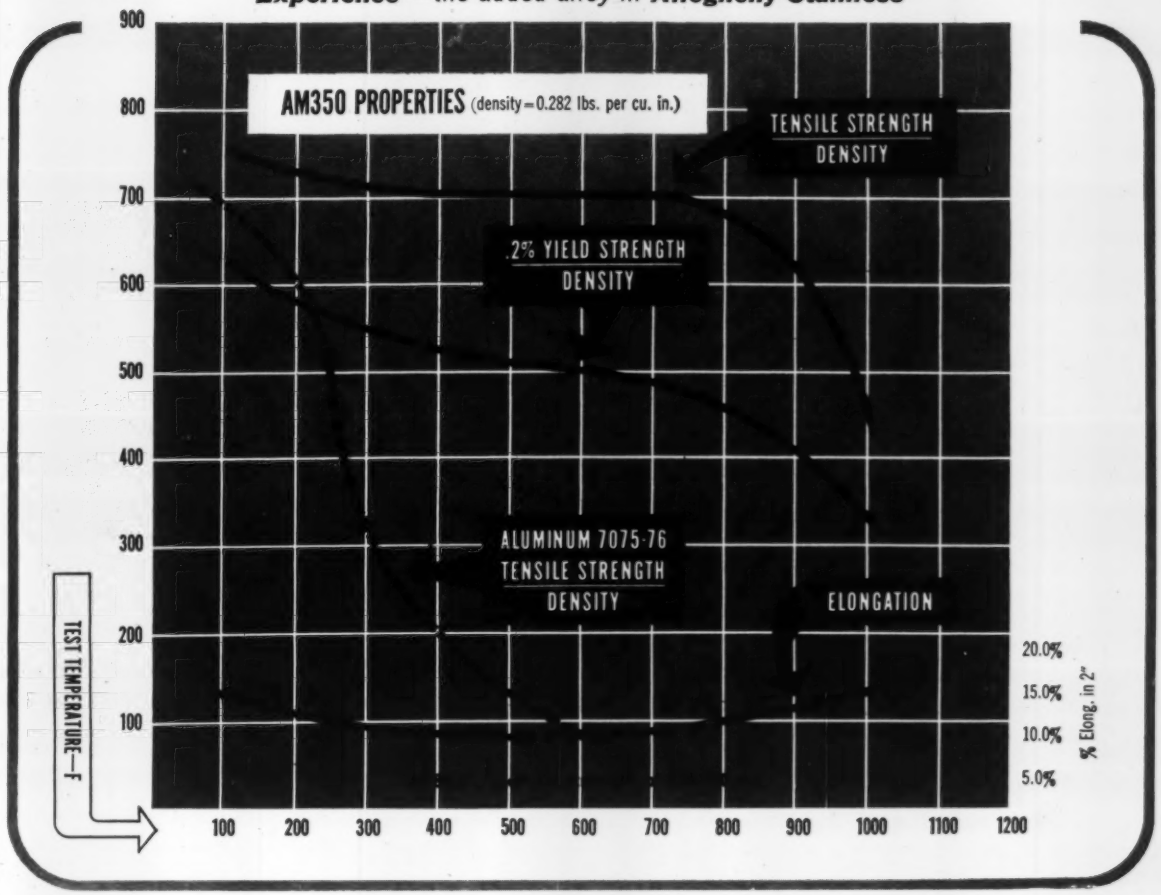
YOUR NEAREST AO SAFETY PRODUCTS REPRESENTATIVE CAN SUPPLY YOU

NOTE: Your Safety Director has full particulars on these safety glasses. He knows there is no substitute for quality in safety. Look to him!

American Optical COMPANY
SAFETY PRODUCTS DIVISION
SOUTHBRIDGE, MASSACHUSETTS

Always insist on the AO Trademark on lenses and frames.
Safety Service Centers in Principal Cities

Experience *— the added alloy in* ***Allegheny Stainless***



Two for the space age—AL's AM-350 and AM-355 precipitation hardening steels

A unique combination of highly desirable properties describes Allegheny Stainless AM-350 and AM-355 Steels. They combine high strength at both room and elevated temperatures, excellent corrosion resistance, ease of fabrication, low temperature heat treatment, good resistance to stress corrosion.

They are proving the answer to many space age problems. Airframe and other structural parts, pressure tanks, power plant components, high pressure ducting, etc. are all natural missile and supersonic aircraft applications for AM-350 and AM-355.

AVAILABILITY: AM-350, introduced several years ago, is available commercially in sheet, strip, foil, small bars and wire. AM-355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars and wire.

CORROSION RESISTANCE: Compared to the more familiar stainless grades, AM-350 and AM-355 resist corrosion and oxidation better than the hardenable grades (chromium martensitic) and only slightly less than the 18 and 8's. They resist stress corrosion at much higher strength levels than do martensitic stainless grades.

SIMPLE HEAT TREATMENT: High strength is developed by two methods. Both minimize oxidation and distortion problems. The usual is the Allegheny Ludlum-developed sub-zero cooling and tempering (SCT): minus 100F for 3 hrs plus 3 hrs at 850F. Alternate method is Double Aged (DA): 2 hrs at 1375F plus 2 hrs at 850F.

EASY FABRICATION: AM-350 and AM-355 can be spun, drawn, formed, machined and welded using normal stainless procedures. In the hardened conditions, some forming may be done . . . 180 degree bend over a 3T radius pin. Also AM-350 can be dimpled in the SCT condition to insure accurate fit-up.

For further information, see your A-L sales engineer or write for the booklet "Engineering Properties, AM-350 and AM-355." *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. S-17*

WSW 7516

ALLEGHENY LUDLUM

Export distribution: AIRCO INTERNATIONAL

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

AL

it will still be as beautiful
when she grows up

UNILOY
STAINLESS STEELS

Yes . . . when she's ready to drive her own car, she too will want the long lasting beauty and protective qualities of solid stainless steel trim . . . and if this car is still around, the trim will be just as beautiful as it is today.

For stainless that offers maximum ease of fabrication and lasting, lustrous finish, specify Uniloy Stainless Steel.

UNIVERSAL CYCLOPS
STEEL CORPORATION
BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

Making fork-lift history!

Certified Job Studies continue to report new records of productivity and profit with Towmotor Fork Lift Trucks at work throughout industry. These reports by users show Towmotor handling great varieties of loads in factories, mills, yards, docks and warehouses. Unloading raw materials. Feeding production lines. Storing goods. Preventing platform tie-ups. Loading boxcars and trailers. Saving record amounts of time, space, effort and handling dollars in every industry . . . including *yours*.

These comparative statistics are readily available to you. Ask for *Certified Job Studies* applying to your own business—and *Pace-Maker Booklet SP-23* describing new Towmotor Fork Lift Trucks. Write Towmotor Corporation, Cleveland 10, Ohio.

COME SEE US AT . . .
1959 MATERIAL HANDLING INSTITUTE'S EXPOSITION
CLEVELAND AUDITORIUM
JUNE 9-12 1959
BOOTHS 1302-1307-1404

TOWMOTOR
THE ONE-MAN-GANG ®

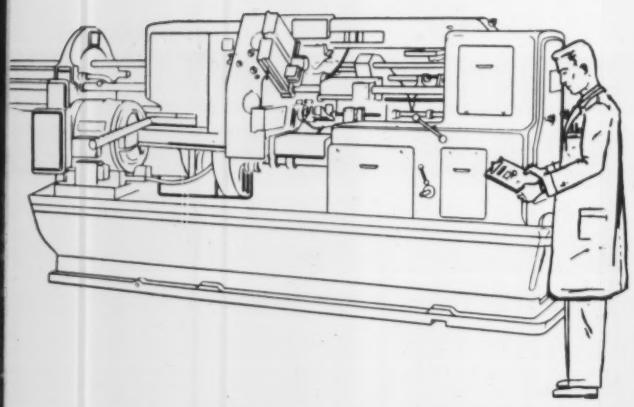
-GERLINGER

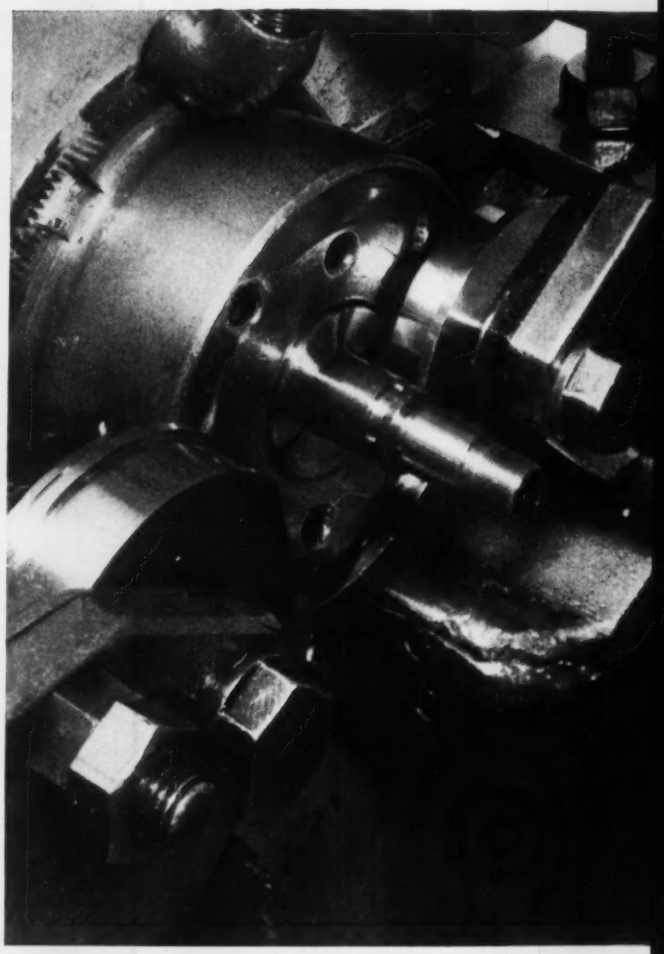
LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

Why Lusterized® Bars

...NO PROCESSING GRIT,





Another Remarkable Benefit From Using Bliss and Laughlin's Patented LUSTERIZED® Finish Cold Drawn Steel Bars

The bright, clean finish of Bliss & Laughlin's Lusterized cold drawn carbon and alloy steel bars has more advantages than appearance alone.

One of the most enthusiastically mentioned is a very practical production advantage—the virtual elimination of the need to clean the chucking mechanisms of automatic bar machines between job set-ups.

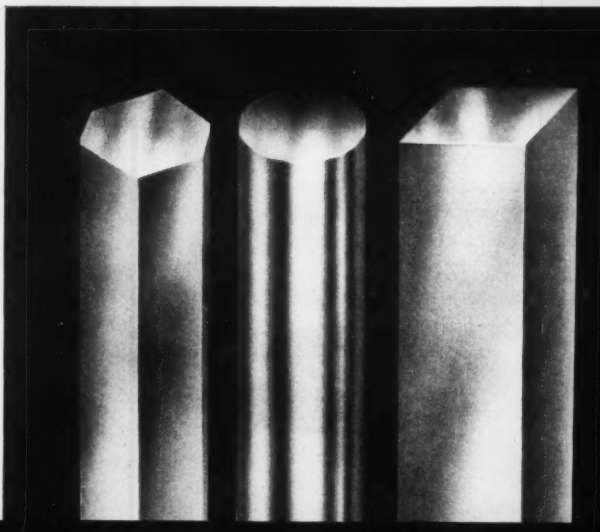
This saves time and money. Production schedules run faster and smoother. From beginning to end, Lusterized bars start cleaner, work cleaner, finish cleaner.

EXCLUSIVE, PATENTED FINISHING PROCESS

The secret is Bliss & Laughlin's exclusive, patented Lusterizing process which removes the processing grit, oils and lime that clog the chucking mechanisms. Just how this is avoided is explained at the right.

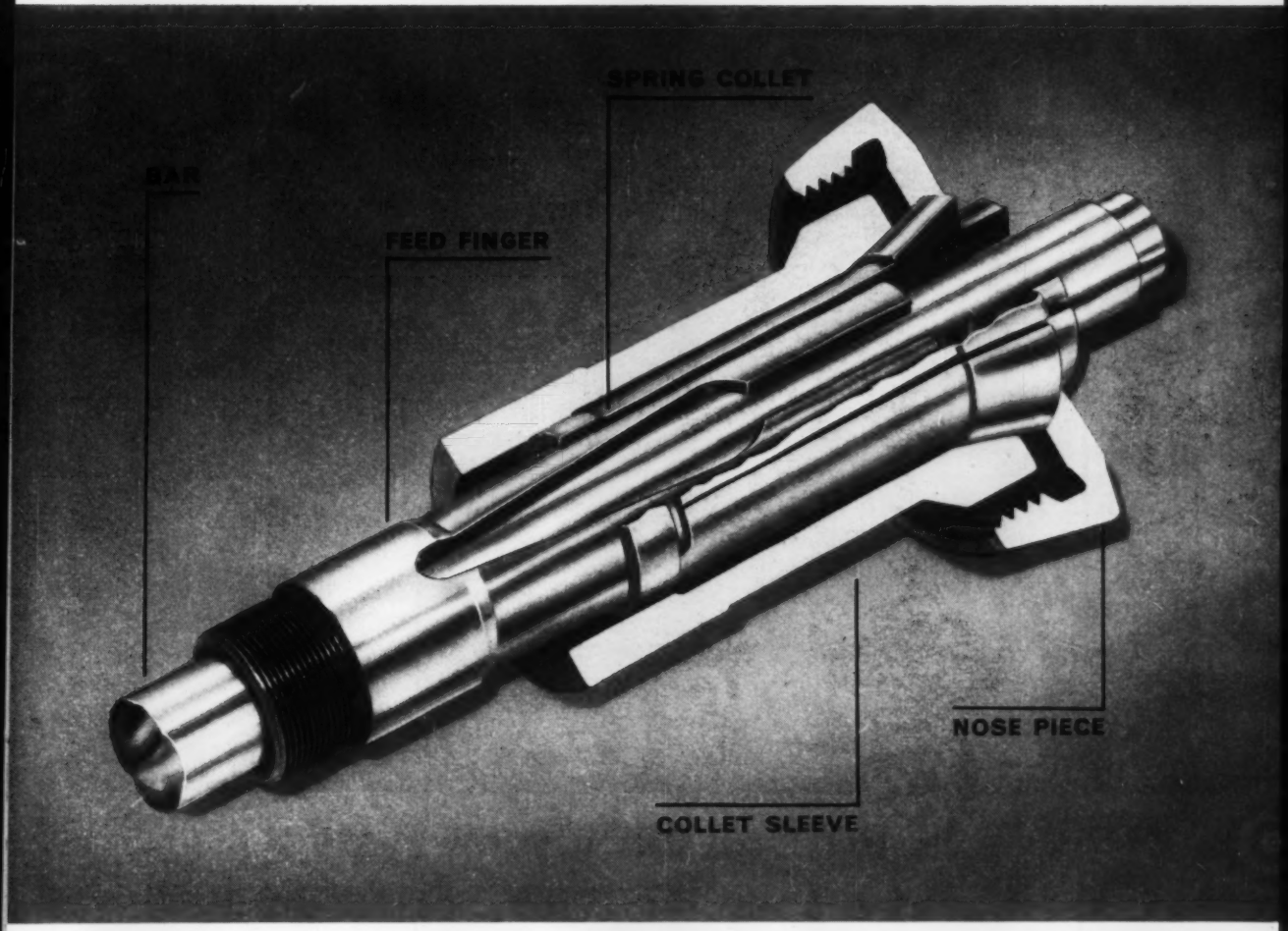
Here again is another profit-wise reason why it's just good business to specify the big difference in cold drawn steel bars—the Bliss & Laughlin Lusterized difference. Especially satisfying is the knowledge that you pay only standard prices, and that Lusterized bars conform to the new closer tolerances recently announced by Bliss & Laughlin.

The BIG DIFFERENCE In Cold Drawn Steel Bars Is The Bliss & Laughlin LUSTERIZED® Difference



Don't Clog Automatics

OIL OR LIME TO FOUL CHUCKING MECHANISMS



The photo at the left above shows the production station of a single-spindle automatic bar machine. Familiar to all is the substantial time consumed in cleaning dirt accumulations from the chucking mechanism, caused by the scraping action of the feed fingers on ordinary cold finished bars during feed outs. The front and back slides, the circular form tools and the tool holders must first be removed. The nose piece then must be removed and finally the chucking mechanism, which includes the collet sleeve and the collet. On a multiple-spindle automatic, several hours can be consumed in this cleaning operation.

The illustration above shows why foreign matter in the chucking mechanism causes sluggish operation, sticking of the collet sleeve and run outs. During the feed out operation, the processing grit, oil and lime on ordinary bars is scraped off when the feed finger returns to the operating position. This dirt works through the openings in the feed finger into the slits in the collet and on through to the collet sleeve. Wiping ordinary bars before machining does not effectively eliminate the processing grit, oil and lime which the Bliss & Laughlin Lusterized process removes at the mill.

Originators of LUSTERIZED® Finish—The BIG DIFFERENCE in Cold Drawn Steel Bars

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

Why Lusterized® Bars

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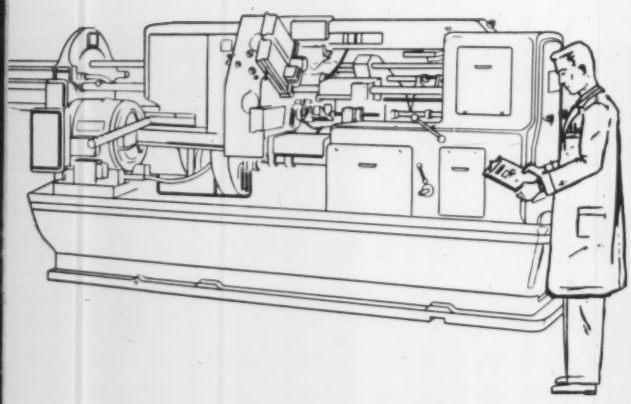

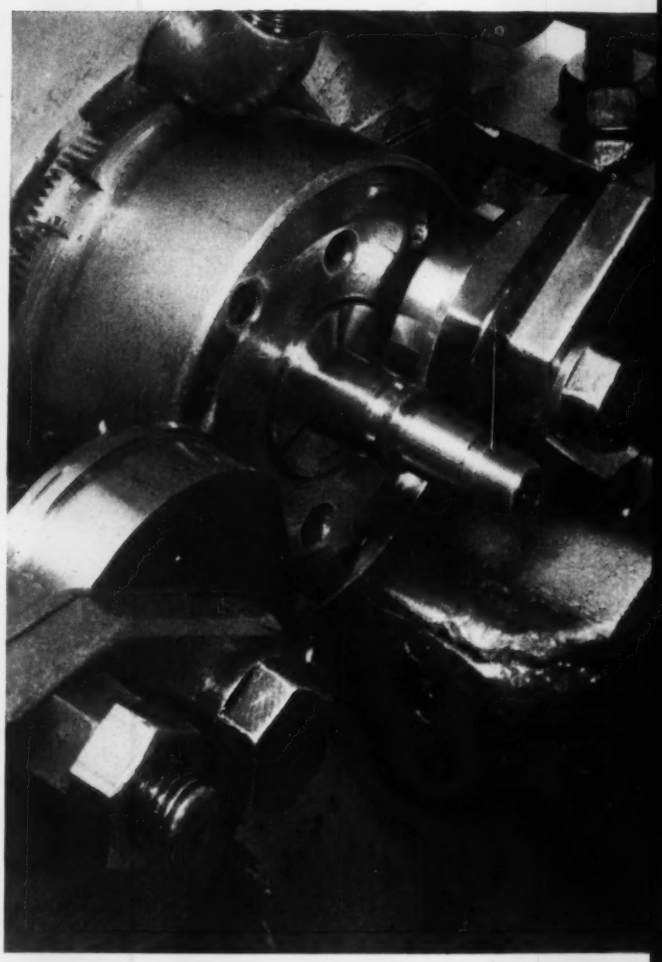

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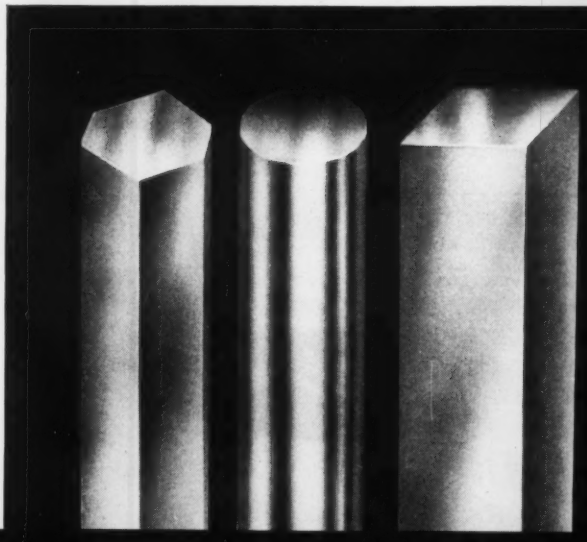

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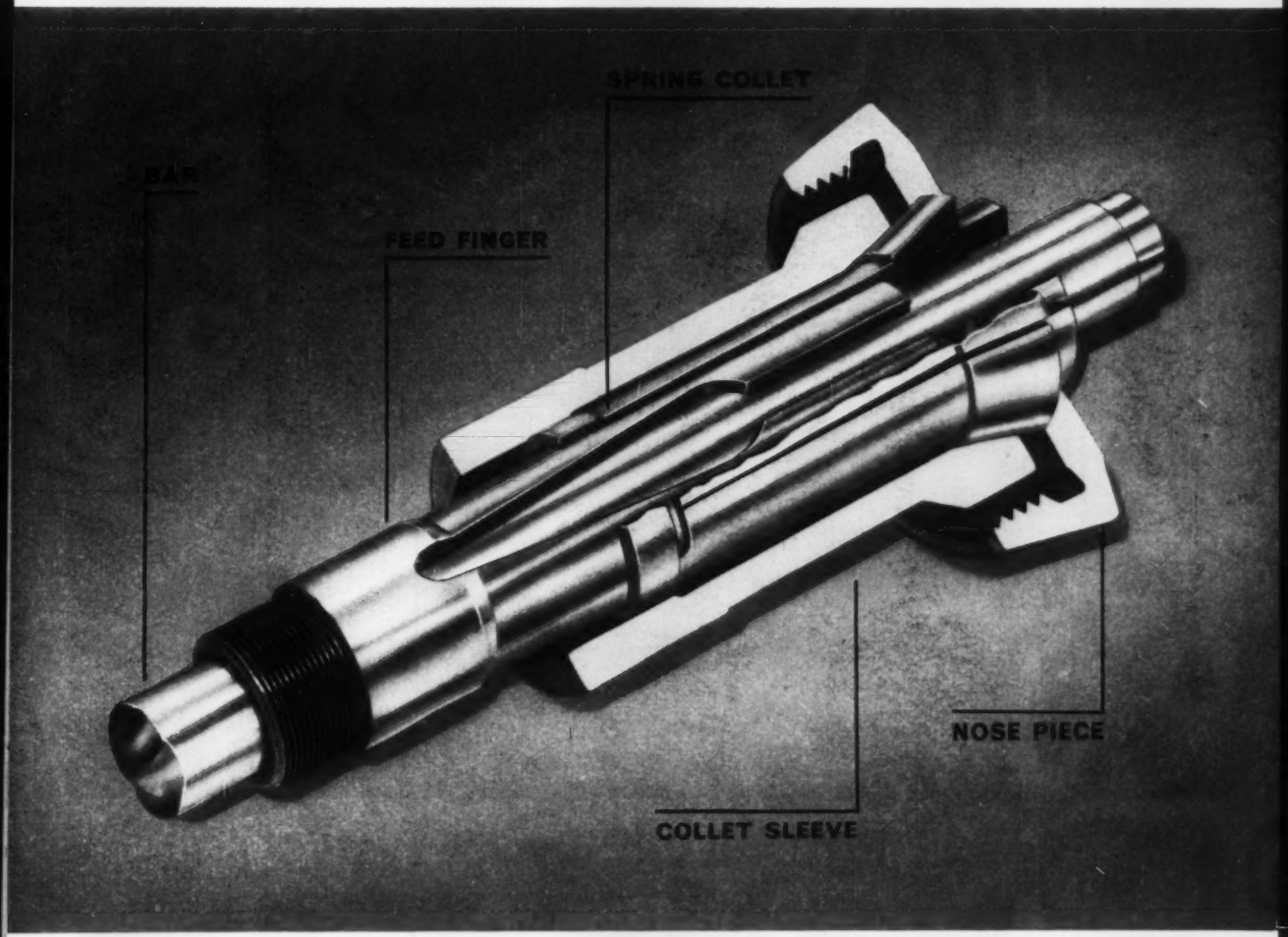

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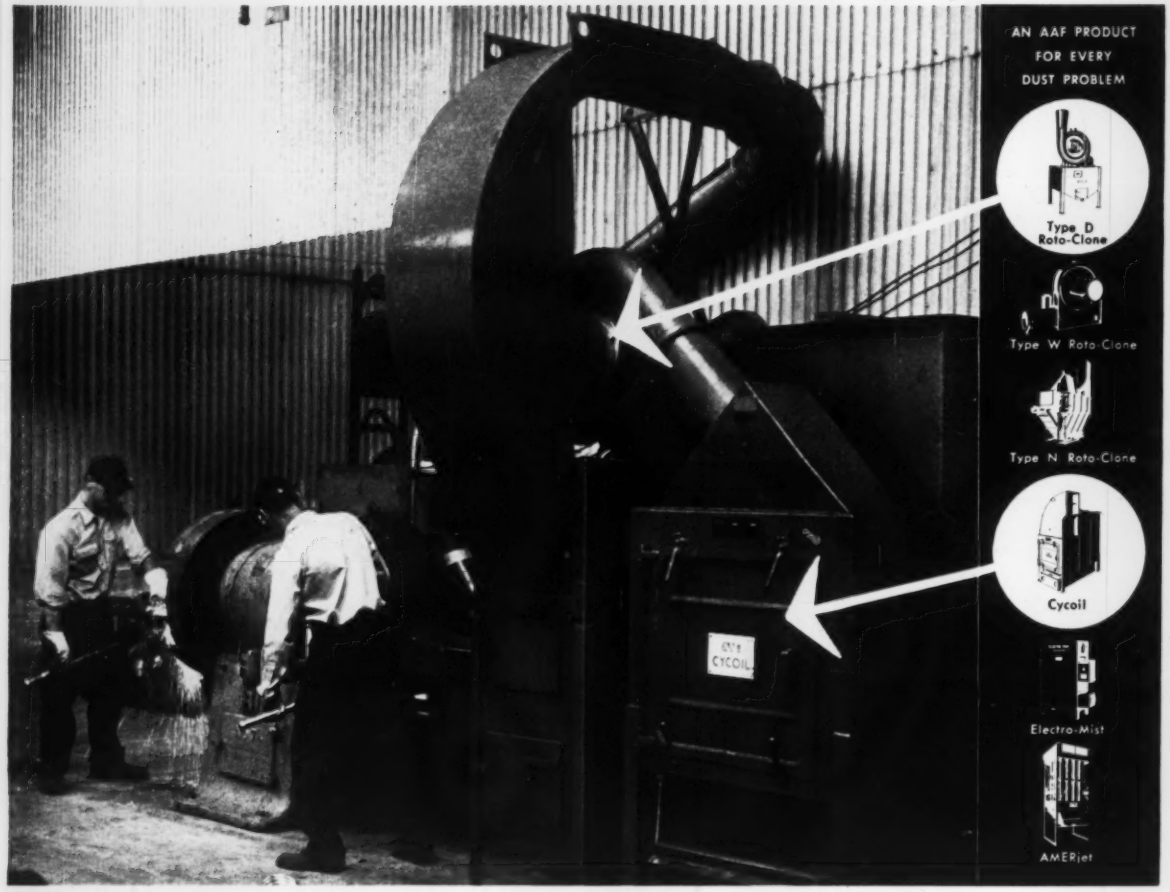
GRINDING



AAF ROTO-CLONE-Cycoil system saves money for Duer Spring Co.

● Here's what AAF's team of Type D ROTO-CLONE and Cycoil is doing for Duer Spring Company, McKees Rock, Pennsylvania: (1) eliminating *all* spring grinding dust, (2) saving on fuel bills by returning cleaned air to workroom, and (3) lowering maintenance costs by preventing oxidation to building. Most dust particles are removed by the Type D, and the Cycoil eliminates the rest!

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem. Where are troublesome dust, fumes or mists causing you trouble—grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

If grinding dust is your problem, call your local AAF representative, or write direct for Type D ROTO-CLONE Bulletin 272A and Cycoil Bulletin 285A. Address Mr. Robert Moore, American Air Filter Co., Inc., 443 Central Ave., Louisville, Ky.

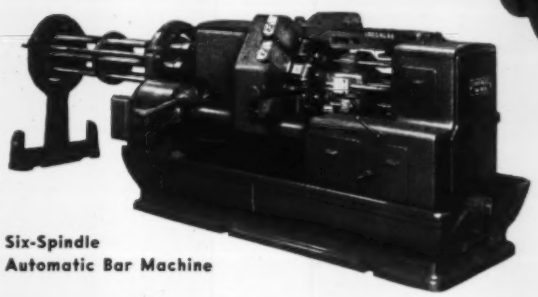
AAF **American Air Filter**

BETTER AIR IS OUR BUSINESS

GREENLEE MILLING ATTACHMENT

PRODUCTION MACHINERY

GREENLEE



Six-Spindle
Automatic Bar Machine

Mounts on Main Tool Slide

The Greenlee milling attachment eliminates second operation milling on many jobs. Two millers, normally mounted in 3rd and 4th positions, can profitably mill squares or double slot end of work piece at bar automatic speeds. The cutter head rotates at the same RPM as the work piece. Cutter speed is independent of spindle speeds. The Greenlee milling attachment is only one of many versatile standard and special attachments that expand your job range . . . increase your profits. Find out how Greenlee attachments can help you. Get the details from your Greenlee Distributor.

Write for your copy of Catalog A-405 — first step on the way to more profitable production with Greenlee Automatic Bar Machines.

OTHER GREENLEE ATTACHMENTS AVAILABLE

- Eccentric Boring
- Eccentric Drilling
- Eccentric Forming
- Eccentric Turning
- Crimping
- Gear-Fed Reaming
- Relieved Type Facing
- Thread Rolling
- Broaching
- Trepanning
- Hollow Milling
- Burring

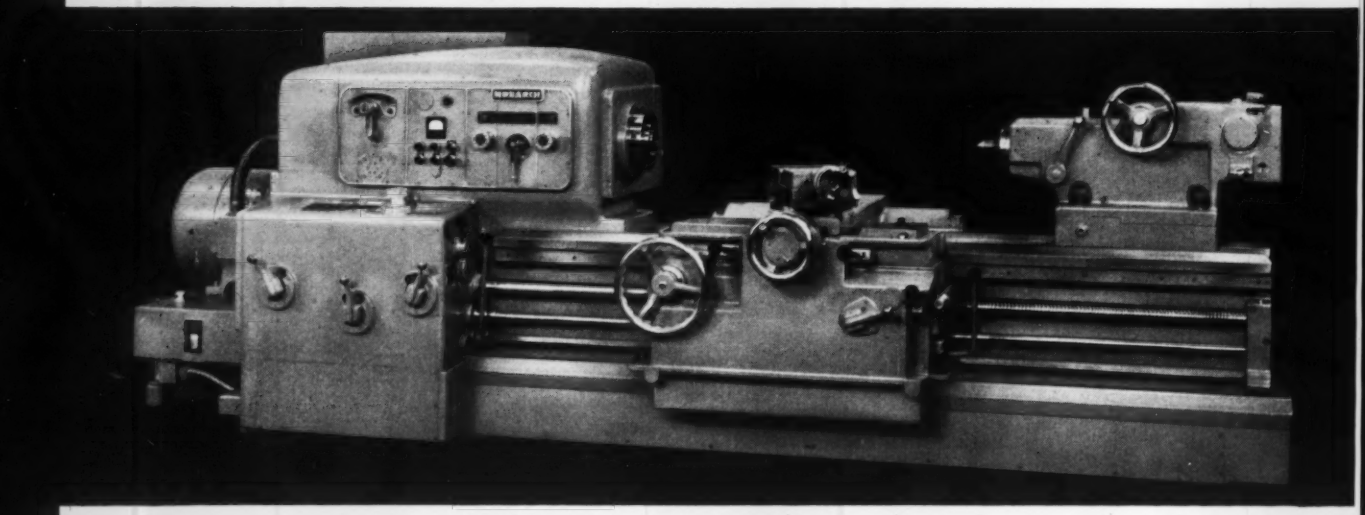
GREENLEE STANDARD AND SPECIAL MACHINE TOOLS

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines
- Die Casting Machines

GREENLEE
BROS. & CO.

1754 MASON AVE.
ROCKFORD, ILL.

BIG-BY 2 YARDSTICKS!



Heavy duty lathes are intended primarily for heavy stock removal from large work having considerable weight. But more than massive machine components and swing capacity are required. The basic consideration is almost always greater production, therefore lowered costs.

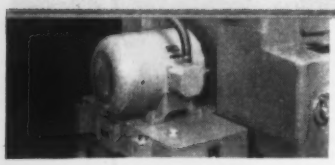
This you get in the Monarch Series 80 Heavy Duty Dyna-Shift—an ultra-modern machine which will remove more metal at any speed than is possible on any other heavy duty lathes. Maximum production results because the machine can be kept under full load during the entire cutting cycle. Major contributing factors are more machine output per unit of power input, less operator effort, reduced maintenance and ease of supervision.

Performance reports from the field reveal production increases of 25% or more along with a like improvement in tool life. As always, invest in the best—the cheapest in the long run. The Series 80 includes two separate machines—two models for work requiring 25″-30″ clearance diameter, 16″-20″ swing over cross slide and three models for larger and heavier work in the range of 32″-40″ clearance diameter and 20″-28″ swing over cross slide.

These machines are big in size and even bigger in productivity—Ask for Booklet 1603.

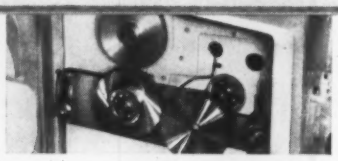
THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO

PRODUCTIVITY



ELECTRICALS RIGHT WHERE THEY BELONG

1. External main drive motor mounting and external electrical control mounting (either NEMA or JIC) for quick accessibility.
2. Motor mounted on hydraulic system sump also supplies power for hydraulic pump.



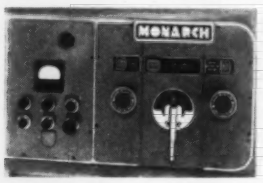
PROTECTED GEAR BOX AND END GEARING

1. Both the gear box and end gearing are totally enclosed. Lubrication is kept in, dirt kept out, original accuracy maintained.

SPECIAL INTERLOCKS—SAFETY FIRST

1. When machine is started, the brake engages automatically, preventing spindle rotation regardless of main control lever position.
2. No speed shift can be made with spindle rotating. More than anything else this preserves the original accuracy of headstock gearing.
3. Leadscrew and feed rod cannot be engaged simultaneously; neither can feed and power rapid traverse.

WEIGHT



THE HEADSTOCK THAT THINKS

1. 36 speeds—range 10 to 1250 R.P.M. on some models, 8 to 1000 R.P.M. on other models—ratio 1 to 125. Standard range low enough, high enough, with plenty of speeds in between to provide reasonably constant surface cutting speed on most work.
2. Operator works in terms of surface cutting speed. Machine automatically figures correct R.P.M. and sets up shift. Operator sets two dials—one for work diameter, the other for desired surface speed. A speed indicator always shows the R.P.M. in engagement.
3. Flip of a lever gives free spindle in a jiffy. And there is a generous 3-1/16″ or 3-9/16″ hole through the spindle.
4. Hydraulic brake and clutch are self-adjusting for wear. Being under automatic machine control regardless of load, operator needs not supply power for engagement.

APRON—THE CONTROL CENTER OPERATORS GO FOR

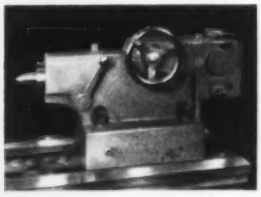
1. Provided with four-way, hydraulic, variable speed power rapid traverse. Both carriage and cross slide traverse may be engaged simultaneously. Infinitely variable speed feature permits such extremely close control that manual handwheel traverse is virtually eliminated.
2. Apron and cross feed handwheels automatically disengage during traverse as a safety feature. A single jaw clutch in each mechanism causes feed pick-up at the same point after any traverse movement.
3. Positive, cam controlled feed frictions. Application is such that machine never loses its chip under the heaviest of cuts.
4. All controls located to permit operation from a stand-up position—no stooping or stretching necessary.

THE BED—SOLID AS GIBRALTER

1. All four bed ways flame hardened and precision ground to keep them factory-fresh for years to come.
2. Triangular bridge type girth construction provides stability needed for heavy duty work. Center section of bed designed in such a manner that chips automatically flow through openings in the rear to chip pan for extra-easy removal.
3. With chip pan set to rear and low work center height, operator can get conveniently near the spindle to change centers, chucks, work pieces and so forth.
4. Longer machines equipped with traveling rod supports which are automatically picked up and dropped off by apron.

EXTRA EQUIPMENT—EXTRA PRODUCTION

1. Additional equipment in considerable variety is available for the Series 80 line. Consider, by all means, the advantages of the "Air-Gage Tracer", a means by which thousands of users have reduced costs substantially.
2. Ask for descriptive Booklet 1603 which not only describes the basic machine but the commonly used items of additional equipment and includes full specifications.



THIS TAILSTOCK MEANS BUSINESS

1. Either single speed or two speed range type available with dead or anti-friction center spindle. Sufficient mass, rigidity and spindle size (5-3/4″ or 6-1/2″ diameter) to support the heaviest of cuts.
2. Work piece expansion, due to heat, absorbed by heavy duty springs in tailstock.
3. Handwheel located at front for operator convenience when changing work pieces.
4. Movement along bed manually or by power. This combination satisfies all turning conditions.

COMPLETE AUTOMATIC LUBRICATION

1. Headstock, end gearing and gear box served by single system of the filtered, combination mist-splash type.
2. Apron lubrication system of the circuited, metered and filtered type also provides oil to carriage guide ways and cross slide bearings. There is ample lubrication during both power and manual longitudinal and cross feed.
3. Tailstock has its own lubrication system.

MACHINE CONTROL—THE EASY WAY

1. Series 80 controlled by a three-position lever at the apron. A duplicate lever close to the headstock is provided for setup purposes. With this lever, work rotation may be started or stopped and jogging may be accomplished.
2. Shifting, an operation performed many times each day, is at fingertouch ease and speed. Hydraulic power does the work of clutching, braking, gear shifting and jogging.

SUPERVISION IN A JIFFY

1. At a quick glance, supervisor may check (a) work diameter setting, (b) S.F.P.M. setting and (c) H.P. consumption. This makes it possible easily and quickly for him to assure full productiveness of the machine and the operator at all times.

Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES
FOR A GOOD TURN FASTER TURN TO MONARCH

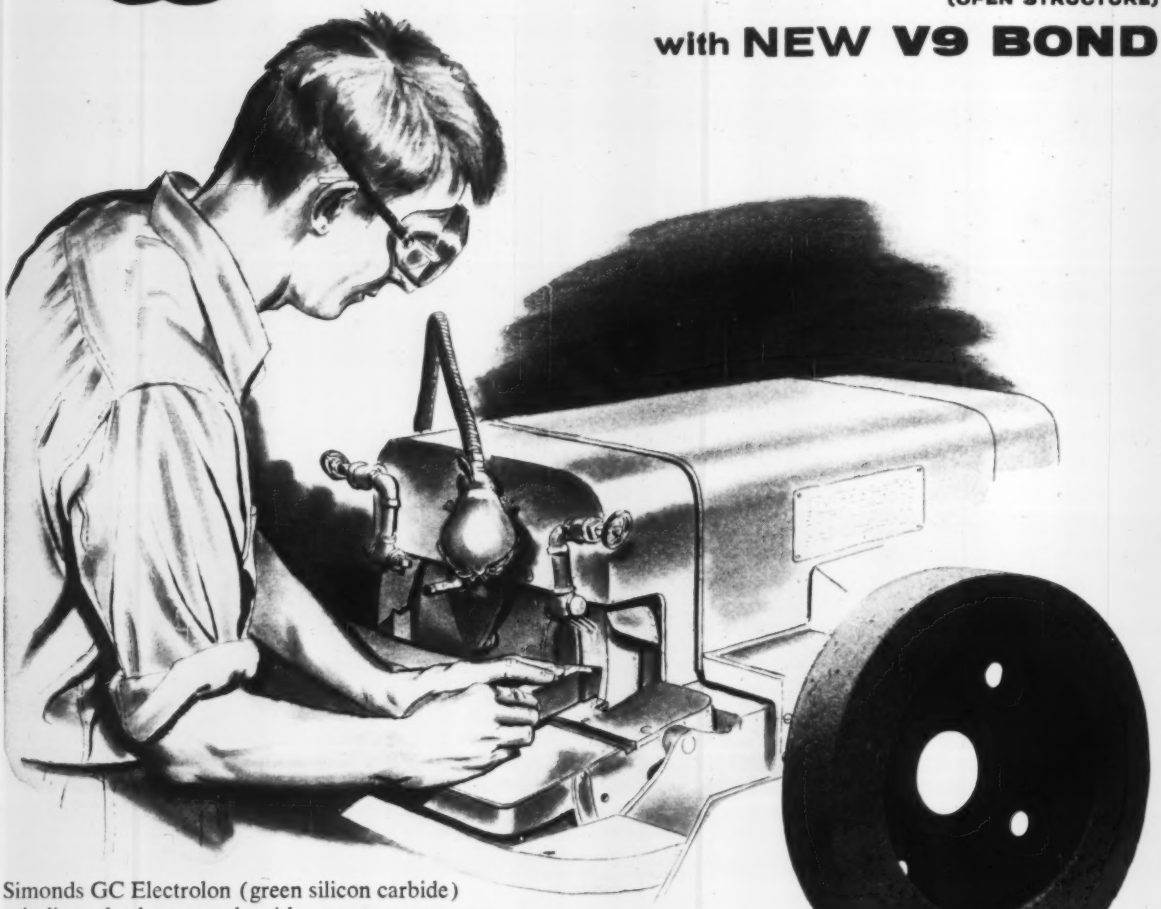
HALT

heat damage to carbide tipped tools

SIMONDS PLATE MOUNTED WHEELS

(OPEN STRUCTURE)

with NEW V9 BOND



Simonds GC Electrolon (green silicon carbide) grinding wheels are made with very open structure by a new method to produce the desired voids or pore spaces . . . for cooler, faster grinding.
The new V9 vitrified bond is a chemically designed glass bond more controllable for more uniform grinding action. Furnished plate-mounted for all grinders. Typical specifications for carbide tool grinding: GC60-H12-V9 for roughing; GC120-H12-V9 for finishing.

CALL YOUR SIMONDS DISTRIBUTOR

Proven products
Dependable know-how
Quick supply

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., • Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO • SHREVEPORT
IN CANADA: SIMONDS CANADA SAW CO., LTD., GRINDING WHEELS DIVISION, BROCKVILLE, ONTARIO

...need Vancoram Ferrocolumbium! For years, ferrocolumbium has been used as a stabilizer in the highest quality stainless and heat-resistant metals. Now its use has been given new impetus by Vanadium Corporation through the development of a production process which makes Vancoram Ferrocolumbium ideal for these metals. The columbium content is especially high, while undesirable elements are kept at levels well within accepted standards.

THERMOCOL* (*Exothermic* Ferrocolumbium) is a special product that permits large amounts of alloy to be added to the ladle without excessive temperature loss, and without contact between the alloy and the furnace slag—thus assuring higher, more consistent recoveries in the steel. Write for more facts about the unusual advantages of using Vancoram Ferrocolumbium Alloys and THERMOCOL. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

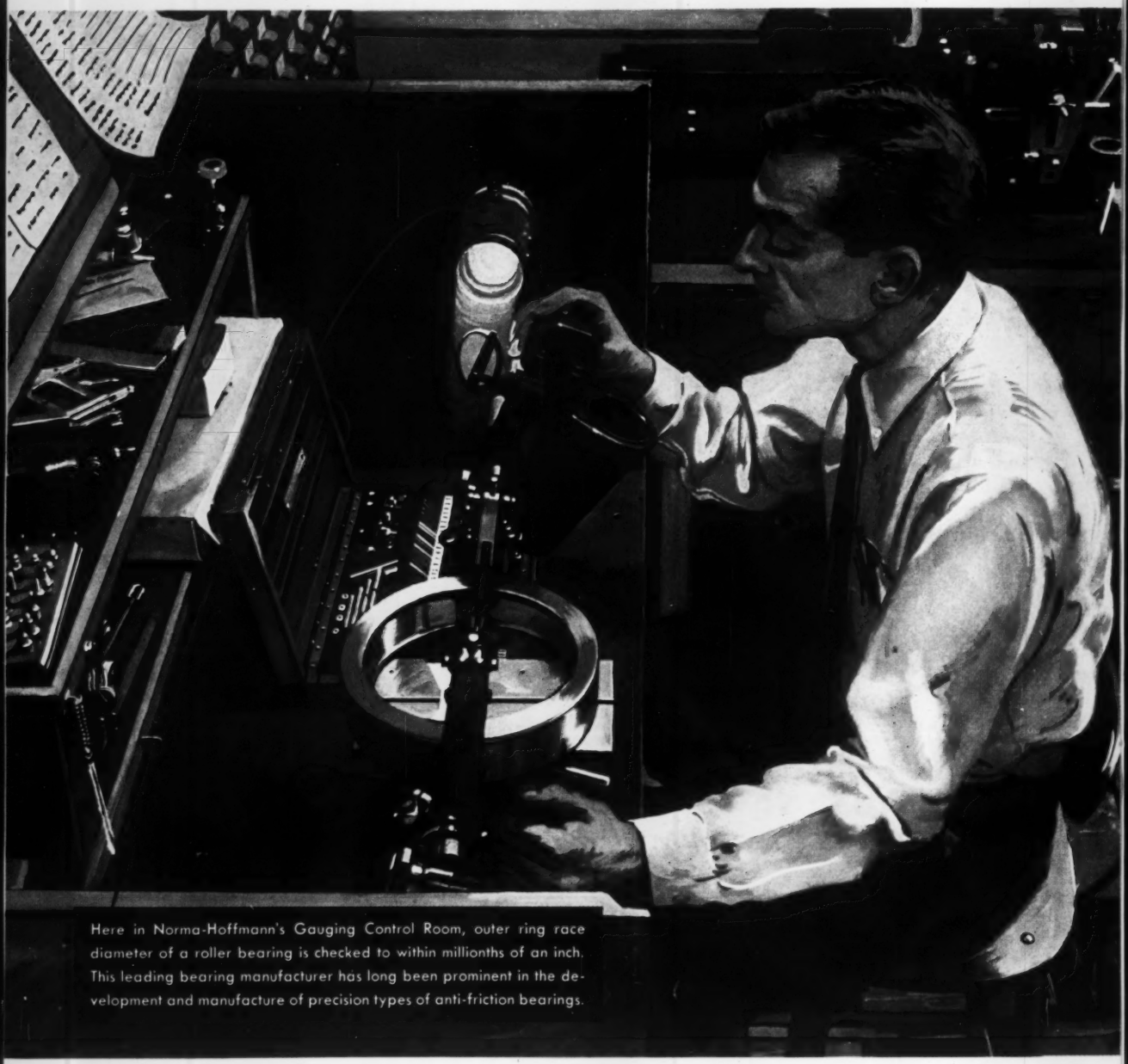
Producers of alloys, metals and chemicals

VANCORAM

VANADIUM CORPORATION OF AMERICA

Correct Lubrication in Action...

Bearing manufacturer



Here in Norma-Hoffmann's Gauging Control Room, outer ring race diameter of a roller bearing is checked to within millionths of an inch. This leading bearing manufacturer has long been prominent in the development and manufacture of precision types of anti-friction bearings.

Mobil

Complete Engineering Program
Proved Petroleum Products

Mobil

rolls up $23,530 saving!

"In a growth company, we cannot afford to delay tomorrow's decisions while we stamp out today's brush fires. What plagues those of us in management are the myriad, small unknown-to-us problems that soar production costs, affect competitive position. This is where Mobil is helping us reduce manufacturing expense and improve production. Our 1958 records show that we saved over three times as much as we spent with Mobil last year . . . a most profitable relationship!"

R. D. Robertson

Vice-President—Manufacturing
Norma-Hoffmann Bearings Corporation, Stamford, Conn.

Mr. Robertson's words underscore the importance of Correct Lubrication to any profit-minded manufacturer. At Norma-Hoffmann Bearings Corporation Mobil lubrication engineers work closely with an extremely cost-conscious maintenance department. Downtime, parts replacements and maintenance costs have been cut—$23,530 saved in 1958 alone. Some of these savings are detailed below.

For example: Sticking valves on one grinder were a constant problem. Cause of the trouble was a mystery. Mobil's representative sent a sample of lubricant from the machine's reservoir to the Mobil laboratory. Analysis report led to cause of trouble—a lead sheathed cable submerged in the oil reservoir was contaminating oil. This detective work on the part of Mobil restored continuous production, saved $5,850 in maintenance costs.

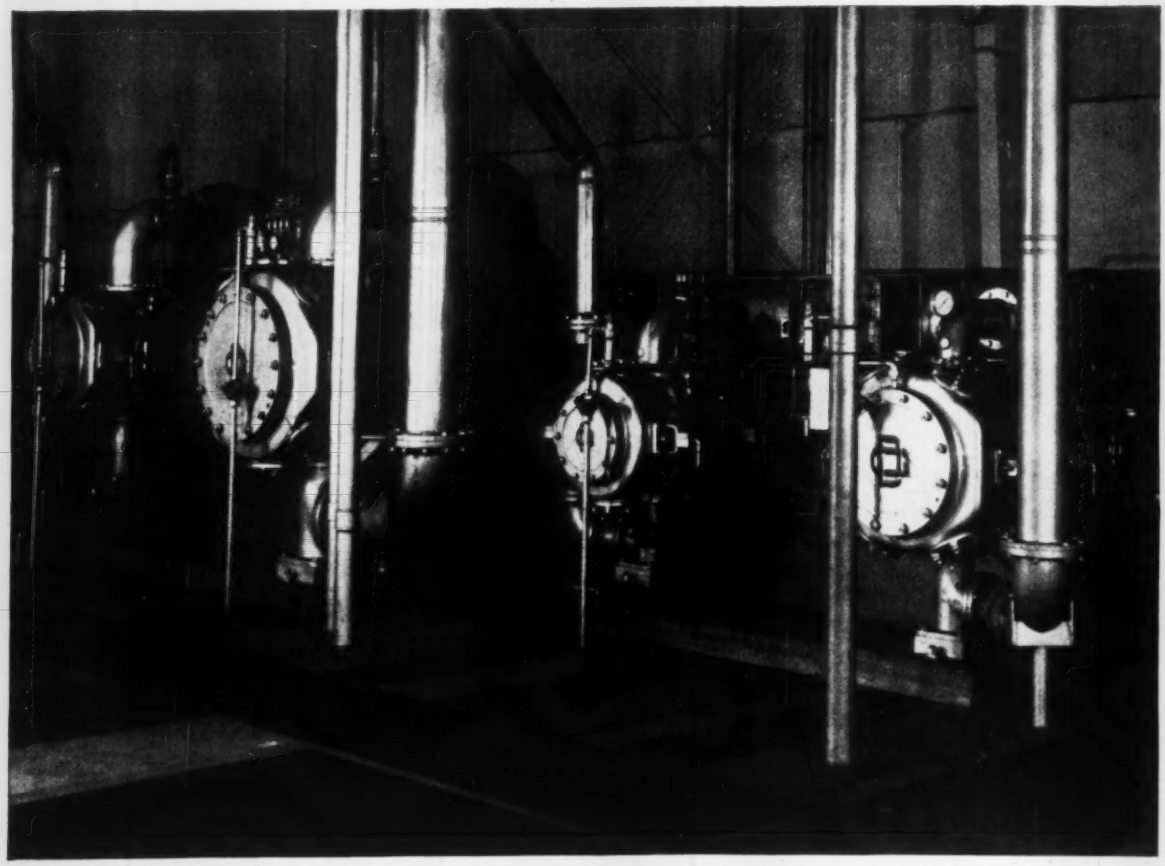
This kind of practical engineering help is just a part of a Mobil program of Correct Lubrication. For complete details on how Mobil can improve your profits call your nearest Mobil representative. You'll find—You're Miles Ahead with Mobil!

Erratic, stick-slip operation of three grinders caused poor size holding. Mobil engineers found trouble was caused by deposits on valves and use of incorrect competitive oil. A correct way and hydraulic oil was installed. Greater production, fewer wheel dressings, less scrap and reduction in valve-cleaning costs saved $8,640.

To keep 16 of Norma's Multiple Spindle Bar machines functioning properly required a weekly 40-minute production interruption on each one to supply lubricant for tool slides. Mobil engineer studied procedure . . . suggested a simple lubrication system modification. Application time was reduced 75%. . . $7,040 saved on production and application.

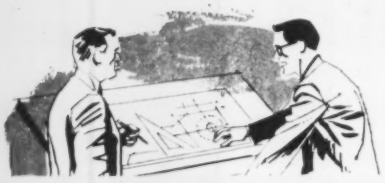
Correct Lubrication

Another reason You're Miles Ahead with Mobil!



New Gardner-Denver HAF compressor (left) now supplies all air for a large plant. HAC (right) was retained as a stand-by unit.

How to modernize your plant with a planned compressed air system



IN INDUSTRY—SPEEDING THE PACE,

the Gardner-Denver specialist is an integral part of the team. He works side by side with engineers and designers, helping to solve their problems, for at Gardner-Denver there's no substitute for men—our 100-year philosophy of growth.

In a sweeping modernization of its compressed air system, a large Midwest foundry recently replaced several small, power-eating compressors with *one* large Gardner-Denver HAF. The new unit is 23 & 13½ x 14, delivering 1750 cfm. Now the plant has a *planned* compressed air system—resulting in considerable power saving, and efficient air flow throughout the plant.

Even though the new HAF supplies all the air for normal plant operations, a Gardner-Denver HAC with a capacity of 750 cfm was retained as a stand-by unit. Other steps in the modernization included installing a new air receiver and a new, larger 8" air line.

It'll pay you to take a close look at *your* compressed air. You may find modernization with a planned system a big cost-saver. A Gardner-Denver compressed air specialist will gladly look at your entire system—your compressor installation, your distribution system, your air uses and your maintenance of air tools. He can recommend the best solution to any compressed air problems you may have.

GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

1959

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

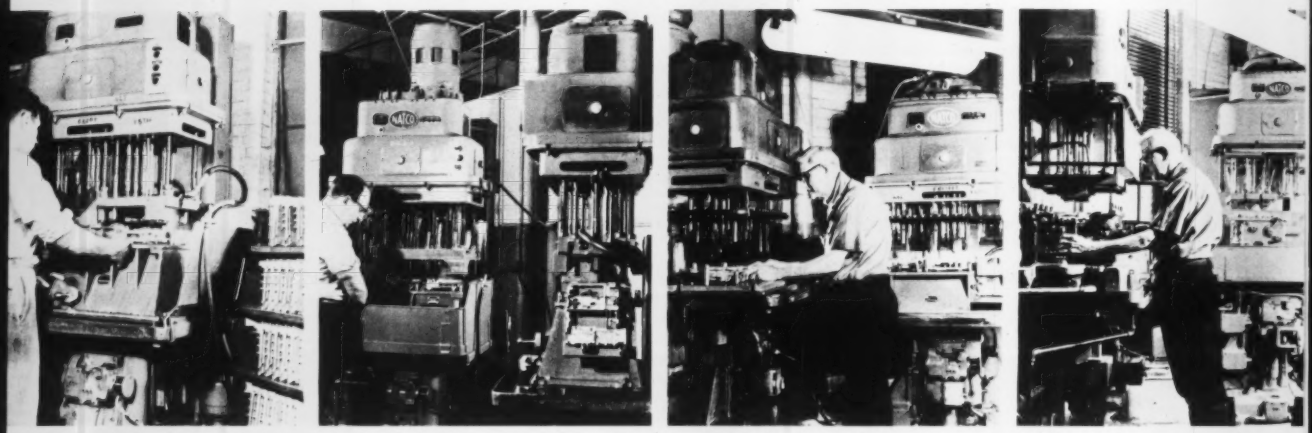
"Let the model change. These high-production Natcos are ready."

. . . says Dictaphone Corporation

(complete story other side)

Five parts for the cost of one!

Fast changeover too!



These 7 standard Natcos do it for Dictaphone!

Costs toppled 81%, savings exceeded $1.00 per part when Dictaphone Corporation, Bridgeport, Conn., switched from gang drill production to this line of seven high-production H-6 Natcos. *Standards*, not specials. They quickly convert when models change; and replacement parts for old models can be run on the same line with minimum time for changeover.

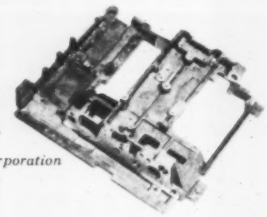
Dictaphone's part is a magnesium main frame for its Time-Master dictating machine. It calls for drilling 97 holes and performing 150 secondary operations—reaming, tapping, counterboring and countersinking on most of them. The seven multi-spindle Natcos handle all but 16 of these operations.

Besides increasing production 81 per cent, the seven Natcos eliminate skipped and creeping holes, and maintain close tolerances. Natco tooling locates the magnesium parts without warping stresses.

On the Natco H-6, the slip plate is the key to flexibility. For example, Dictaphone transferred four Natcos from other assignments, simply by fitting them with new slip spindle plates and, of course, new fixtures. Three new Natcos filled out the line.

Natco H-6 and other multi-spindle drilling machines are available in models from 1 hp with 10 spindles to 50 hp with up to 72 spindles. Write today for complete details or see your Natco representative.

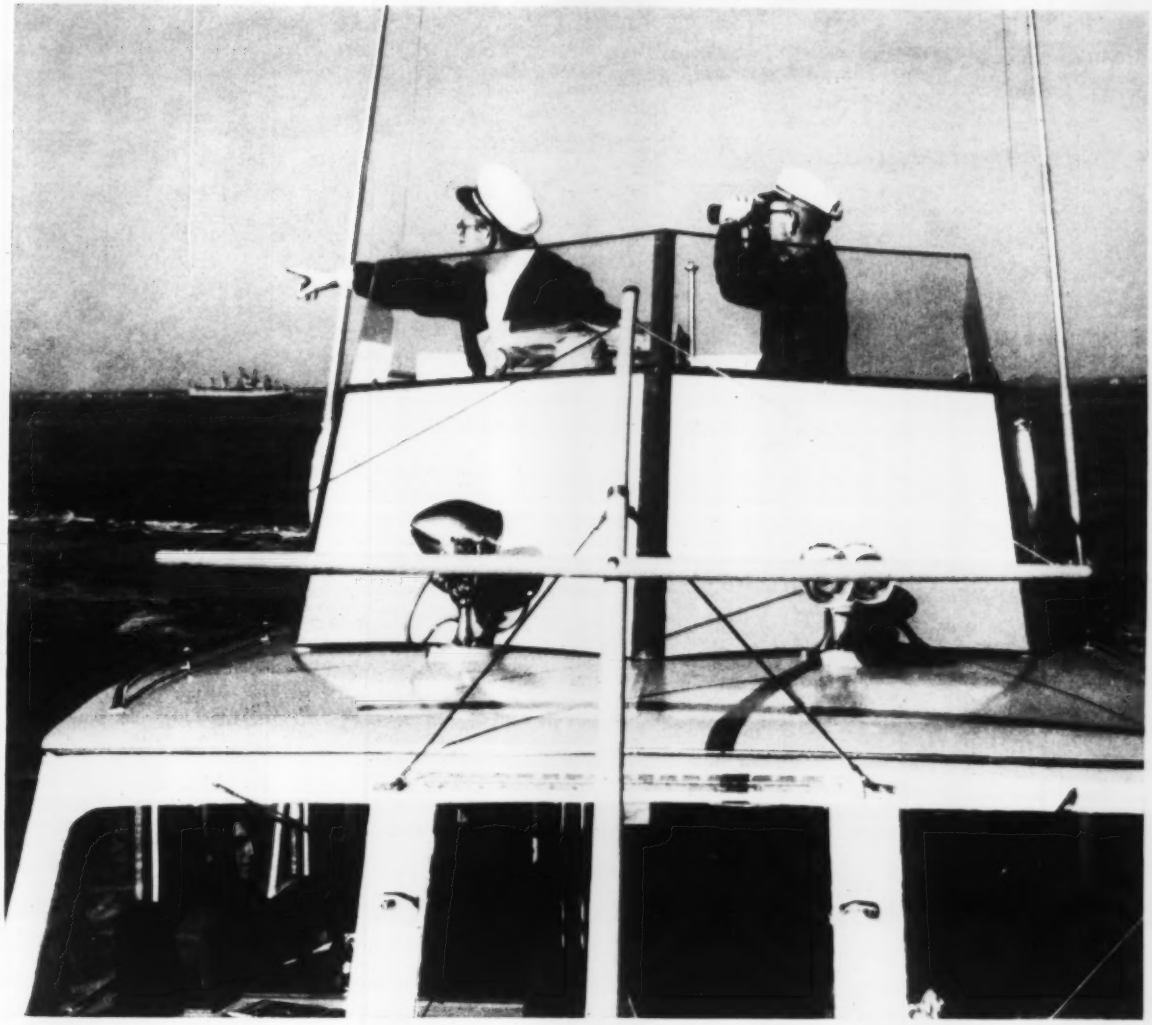
Under the cover of the Time-Master *, . . . profits in 97 holes.



*Registered trademark of Dictaphone Corporation

NATCO

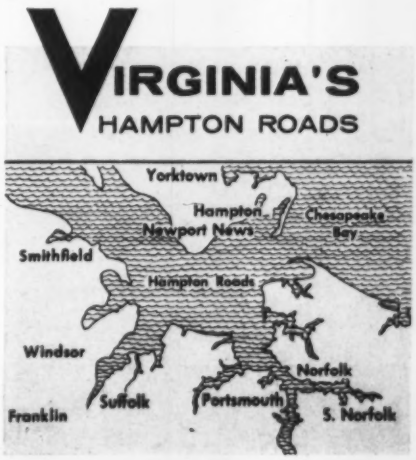
NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, IND.



You could dock the largest freighter at our new plant!

Deep water frontage on Virginia's busy Hampton Roads offers industrial advantages and living advantages in *depth*. You're central to the whole Atlantic Coast. A hundred ship lines link you with world ports. You enjoy superb, long-season boating, swimming, fishing.

Vepco serves this area with a generating capability of over 1,700,000 kilowatts, due to exceed 2,000,000 kilowatts by 1961. And Vepco *knows* this area intimately. For confidential deep-water site-finding help, write or phone



50 YEARS 1909 1959

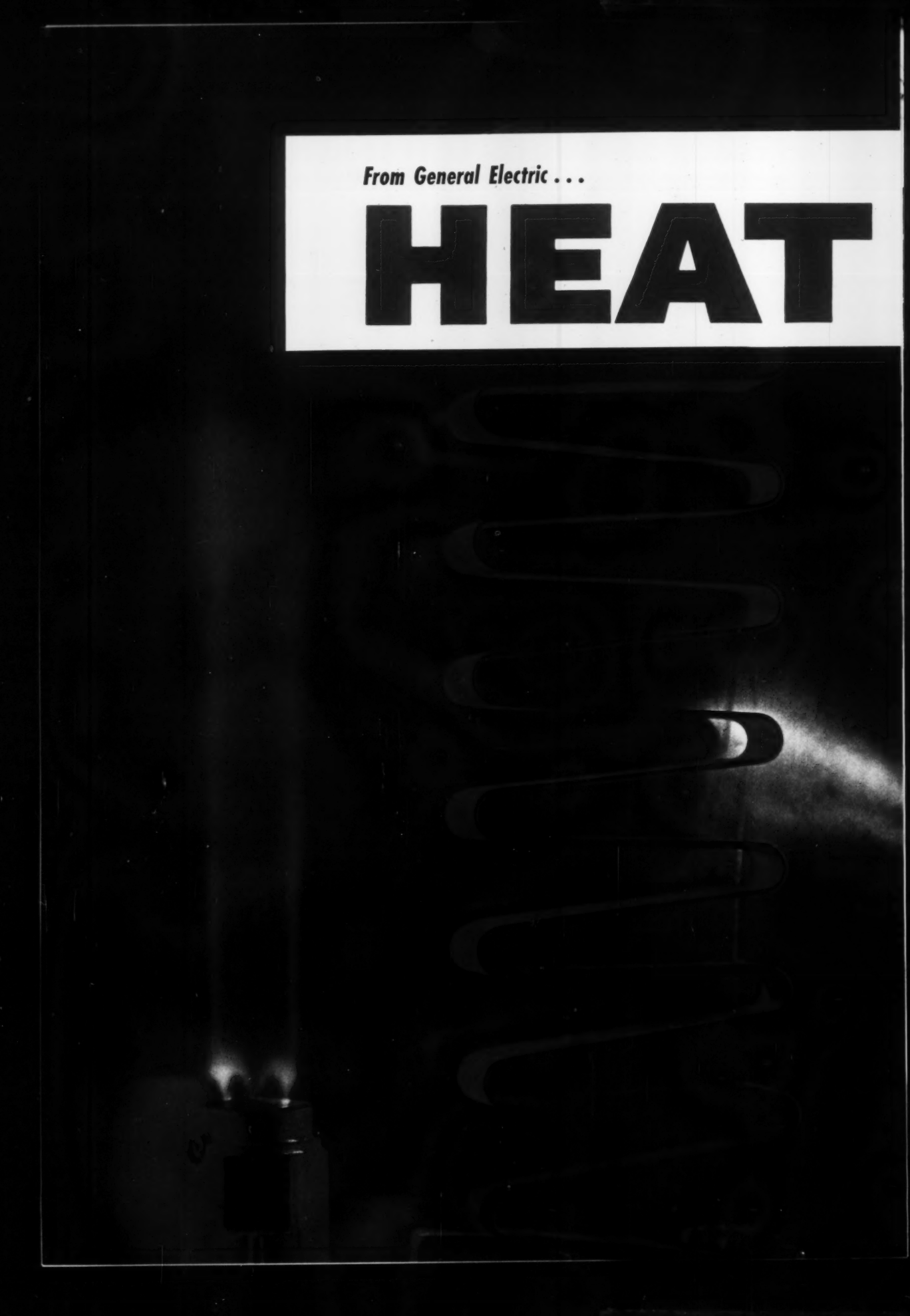
VIRGINIA ELECTRIC and POWER COMPANY

Serving the Top-of-the-South . . . in Virginia, West Virginia and North Carolina

Clark P. Spellman, Mgr., Area Development, Electric Bldg., Richmond 9, Va., MI 9-1411

From General Electric . . .

HEAT



G-E GAS OR ELECTRIC BELL FURNACES GIVE BRIGHT FINISHES AT LOWER COST

Your investment in a General Electric gas or electric bell furnace will pay off in maximum flexibility and minimum spoilage.

And here's an example of what we mean by minimum spoilage. The electric bell furnace pictured below produced perfect wire on the first heat after start up, and has now operated for a full year without spoilage.

The gas-fired bell furnace on the right below was purchased to supplement a continuous pusher furnace. The flexibility provided by "batch" operation of the bell furnace produced real savings in time and money on small loads that require different temperatures and heat treatments.

General Electric bell furnaces can handle many jobs for you . . . a bell furnace is inherently capable of working many shapes and sizes. Operation is simple. Your new General Electric bell furnace can be controlled easily for quick changes of heating cycles and temperatures. Bell furnaces are available in a wide variety of job-tested sizes for you to select from. A complete line of gas atmosphere producers and control equipment is also available. General Electric bell furnaces produce quality work finishes because of the high volume circulation of atmosphere which provides a uniformity of heating. The metal retort contains and controls the protective atmosphere for cleaner, brighter work.

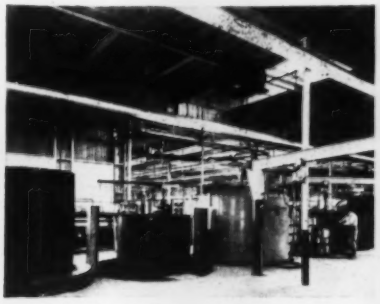
Call your General Electric heating specialist now. He'll show you how your investment in a gas or electric bell furnace system will pay for itself. Use the table below to see how you can use a bell furnace in your business.

Contact your nearby General Electric Apparatus Sales Office, or write Section 721-23, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

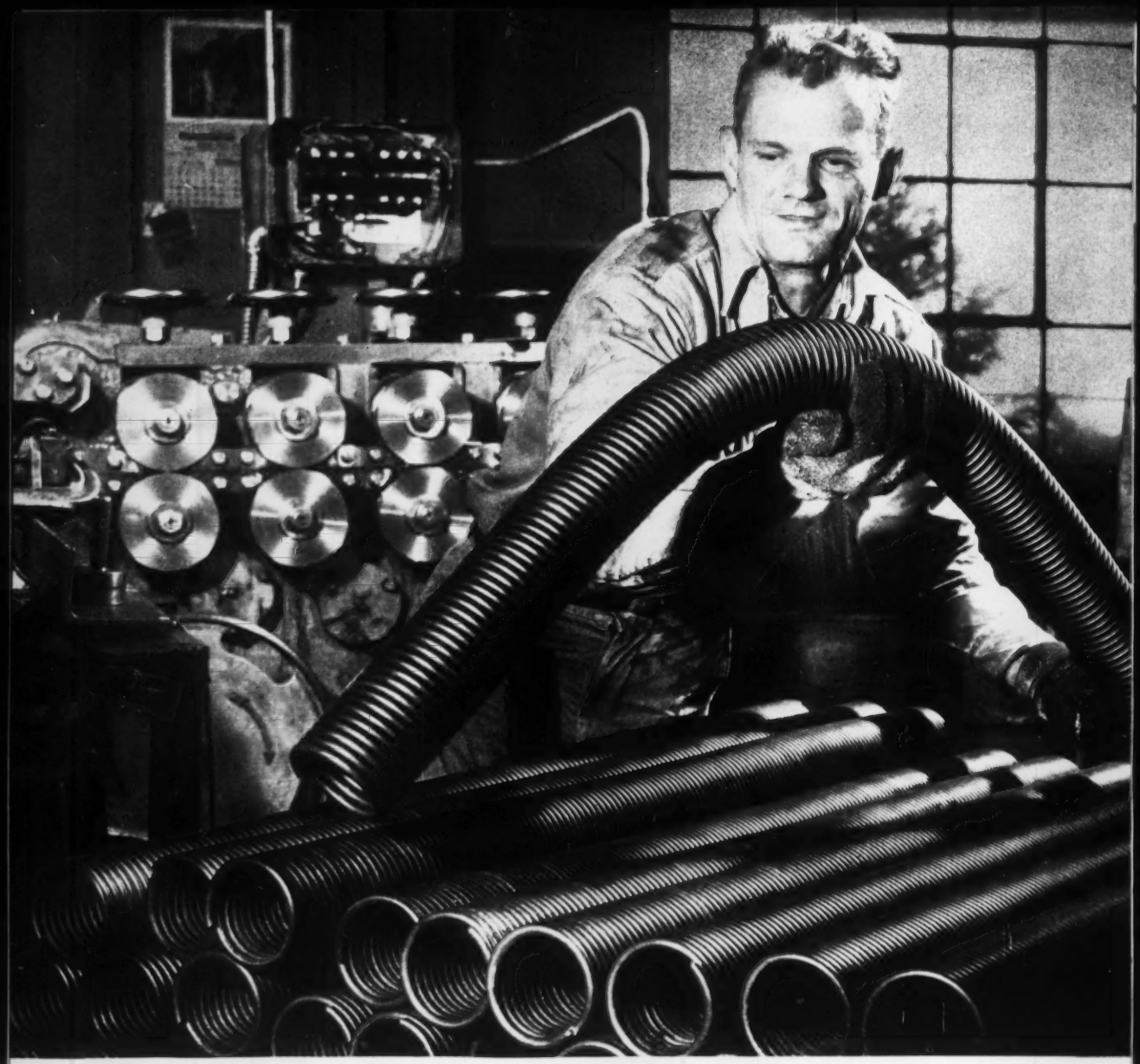
Applications	Castings	Forgings	Rod & Bar	Wire - Coils	Wire - Spools	Tube - Coils	Strip - Coils	Foil - Coils	Fabrications
Aluminum and Alloys	X	X		X	X	X	X	X	X
Copper and Alloys				X	X	X	X	X	X
Iron and Alloys	X	X	X	X					X
Stainless Steel Alloys			X	X		X	X		X
Magnesium and Alloys	X	X		X	X	X	X	X	X
Nickel and Alloys				X	X	X	X	X	
Silver and Alloys				X	X	X	X	X	
Titanium and Alloys				X	X	X	X	X	X

Gas or electric bell furnaces from General Electric, symbolized by the illustration at the left, can handle all jobs shown in the table above.



This electric bell furnace, for example, produced bright, perfect wire on its initial run, and has now run one full year without a pound of spoilage.

This gas-fired bell furnace was purchased from G.E. to provide supplementary batch furnace capacity to handle special loads of copper wire at lowest cost.



Torsion springs for Crawford Door Co.'s Marvel-Lift garage doors are coiled from Pittsburgh Steel Co.'s Oil Tempered MB Wire, from wire .168 inch to .468 inch in diameter.

How Pittsburgh Steel's Wire Makes . . .

Springs That 'Rate'

Crawford Door Co. Depends on Uniformity of Pittsburgh Steel Wire For Precise Engineering of Marvel-Lift Garage, Industrial Doors

Torsion springs which operate Crawford Door Company's garage and industrial doors have to "rate." Here, rate means the force stored up in the spring to supply power for smooth, efficient, finger-tip raising and lowering.

The rate built into any spring—from a 42½-inch long spring on a single car Marvel-Lift residential garage door to a 12-foot long spring on an industrial door—depends on uniformity of wire diameter.

Lack of uniformity throws off engineering calculations and spoils spring performance. Let Elliott Koepfgen, chief engineer for Crawford Door, explain how uniformity of Oil Tempered MB Wire supplied by Pittsburgh Steel Co. helps him design torsion springs to meet pre-determined rates:

"Each of our springs is made to meet a definite rate. This rate is the

torque which can be exerted in one turn of the spring. It provides the force stored up in the spring to operate the doors. By calculating the diameter of the wire, the number of coils and the number of turns the spring is turned back against itself, we can design a spring with the rate we know is necessary to lift a door of a certain weight and height.

"Uniform diameter is a must since variations would drastically affect spring performance. Uniformity helps us design efficient springs which will last the life of the door. If we overbuild the spring we run up production costs. If we underbuild, we get failures in service and customer dissatisfaction.

"Pittsburgh Steel supplies us Oil Tempered MB Wire we can count on to be so uniform that we can treat wire diameter as a known factor in our engineering calculations."

Oil Tempered MB Wire from Pittsburgh Steel Co.'s wire mills is checked at Crawford Door plant by M. J. Duffy, plant manager, left, and W. D. Williams, Pittsburgh Steel Co. salesman.

Here's how it works in two typical designs: for an eight-foot high, 128-pound door in a single car residential garage, Mr. Koepfgen specified a spring made from .263-inch diameter wire. The wire was coiled into a 14.5-pound spring 42¼ inches long with 160 coils. Because the wire was uniform in diameter, each spring made to these specifications had a rate of 60 when the springs were turned back on themselves 7 turns each.

Or take a large industrial door application. For a specially engineered door 12 feet high and weighing 654 pounds, Mr. Koepfgen specified a spring made of .468 wire. The spring was 78¾ inches long, weighed 234 pounds and had a rate of 271 when the spring was turned back 7¼ turns. Because of uniformity in wire diameter, the spring and door combination worked perfectly after installation.

• **Buys 23 gages**—Crawford Door Co. relies on Pittsburgh Steel Co. for oil tempered wire in 23 gages, ranging from .168 inch in diameter for springs 26 inches long to wire .468 inch in diameter, used to coil springs up to 14 feet long.

Uniformity of diameter isn't the only requirement. Crawford Door also insists upon, and gets from Pittsburgh Steel Co., wire with these qualities:

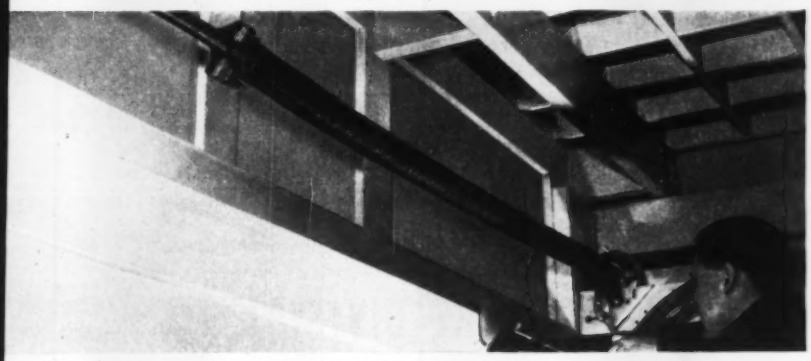
1. Fatigue strength—Springs must have long life without taking a set since garage doors are expected to last indefinitely even in busy places like gasoline service stations.

2. Coilability—Automatic coiling machines can't operate efficiently or economically unless the wire runs through the coilers smoothly. So Crawford wants a good surface free from defects.

3. Proper Temper—Oil tempering and heat treating at the wire mills of Pittsburgh Steel produce wire free from soft and hard spots so that wire can be coiled without bulges which affect performance and shorten spring life.

Plant Manager M. J. Duffy says Pittsburgh Steel supplies wire in shipment after shipment which "gives consistently good results without slowing production or piling up rejects."

Whatever your requirements for manufacturers' wire, whether you're making bobby pins or springs, you'll benefit from the skill and mill facilities which produce wire tailor-made to this customer's specifications. A mill-trained representative is as close as your telephone to help you solve your wire problems or show you how Pittsburgh Steel Co. wire can help reduce costs while improving your product. Call a Pittsburgh man today in the nearest district office.



Installation on garage door. Spring is turned back on itself the calculated number of times and mounted on tubular shaft running width of door. Cables fastened to drums at each side of shaft raise or lower doors. When door is lowered, door weight winds up spring, storing power to be used in raising the door. Lift is applied to both sides of door so it raises evenly, gliding upward in absolutely level position.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

Automatic Transmission Manufacturer Specifies

Annealing furnace at the Shelby mill. Ostuco tubing can be bright or soft annealed, stress relieved, normalized or heat treated.

"As a leading producer of quality transmission components, we can't leave anything to chance. Our design requirements, materials specifications and manufacturing processes are under the most stringent quality control standards. And we demand as much of our vendors.

"One sure way we have found to eliminate the unpredictable is to specify Ostuco Seamless Tubing. We know from experience we can rely on the precision annealing and unvarying quality of Ostuco tubing that slashes reject rates, helps us produce parts in quantity for profit . . ."

If you want to eliminate the unpredictable in your own plant, then it's time you called your local Ohio Seamless representative. He's listed in the Yellow Pages. Or contact the plant at *Shelby, Ohio —Birthplace of the Seamless Steel Tube Industry in America.*

AA-9604

OSTUCO SHELBY OHIO — OSTUCO TUBING

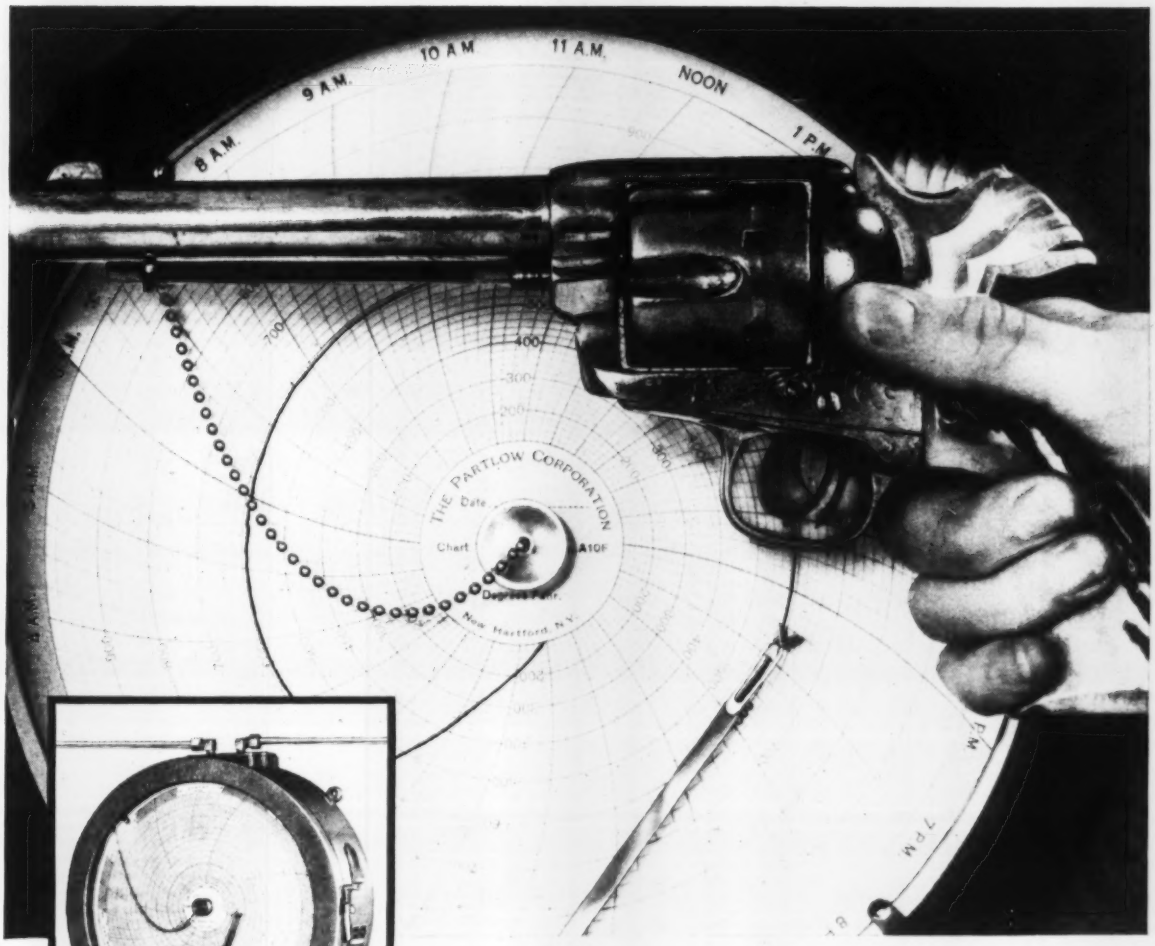
OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

BE SURE TO VISIT BOOTH 205
DESIGN ENGINEERING SHOW
MAY 25-28, PHILADELPHIA

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, St. Petersburg, Salt Lake City, Seattle, Tulsa, Wichita • CANADA: Railway & Power Engr. Corp., Ltd. • EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York



The Control Geared for

HAIR TRIGGER RESPONSE

even to Fractional Changes in Temperature!

NEW *Recording Pneumatic Temperature Control, Model RVA, available in any of 10 ranges from -30° to 1100° F.*

Extreme sensitivity—reflected in lightning-fast reaction to temperature changes—is a characteristic of *all* Partlow controls. Partlow Recording controls, however, *prove it in writing* . . You can see for yourself how exceptional bulb sensitivity, teamed with advanced mechanical design, provide a minimum of "saw-toothing" on start-up, and maintain a rigid line of control when temperature reaches a predetermined set point.

Instant response, of course, is just one of Partlow's many built-in advantages. Another is rugged *design simplicity* that does away with hair springs and delicate electronic gadgets . . . that requires no electronic amplification . . that permits fast, "screwdriver" replacement of the thermal element *right out in the field.*

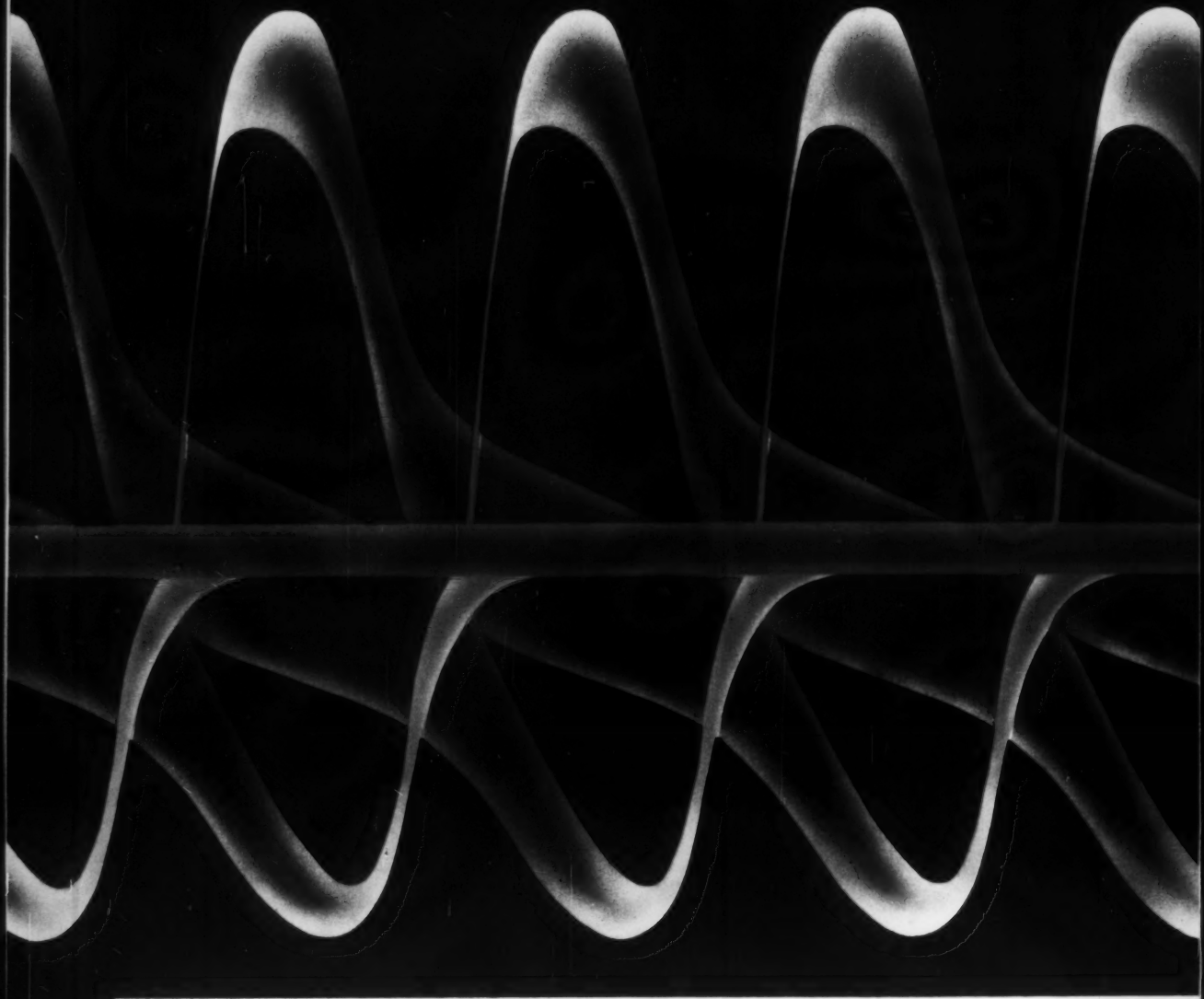
If you use or manufacture process equipment within the -30° to 1100° F. range, there's a Partlow Pneumatic, electric or self contained gas control to fit your application *precisely*. Recording, indicating and non-indicating models available. For full details write The Partlow Corp., New Hartford, New York, Dept. S-559.

Export: Ad Auriema, Inc., 85 Broad St., New York 4, N. Y.

You can pay more but you can't buy better than

PARTLOW

TEMPERATURE CONTROLS



The cathode ray oscilloscope is one of science's and industry's most perceptive instruments for determining uniformity of operation. The pattern reproduced here is a harmonically modulated sine wave of exact uniformity.

Uniformity is Malleable

Just as the input of an oscilloscope can be controlled to produce repetitive patterns, so can consistently uniform metal parts be produced with Malleable iron because of modern, scientific controls. The unique method by which all Malleable castings are made and the exacting techniques employed by Malleable foundries assure Malleable users of castings that are uniform, part after part, regardless of size or shape. This uniformity, combined with unparalleled physical and mechanical properties, ideally suits Malleable castings for modern America's quality products.

For information or service, call on one of the progressive firms that identify themselves with this symbol—

MEMBER

MALLEABLE

CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

Better Products at Lower Cost Result From Malleable Uniformity Controls

Uniform quality — whether for five or five million pieces — is essential to maintain product quality and increase manufacturing efficiency. With accelerating frequency, Malleable castings contribute their unique uniformity in critical applications where durable, reliable components are necessary.

Key to Uniformity is Control

Malleable iron is produced under closely controlled manufacturing techniques. From charge composition and molding sand properties, through final inspection, every critical factor is held constant by using the most modern techniques of metal analysis, process control and inspection.

Internal Uniformity

This versatile engineering material is achieved through converting the base white iron into tough Malleable iron by a controlled heat treating process. Malleable's internal structure exhibits excellent uniformity, an important factor in assuring the dependable performance of intricately designed components.

External Uniformity

Fundamental to the casting process is the ability to produce a given shape, time after time, in either small or large quantities. Metal can be placed exactly where it is needed . . . eliminated where it is not. Good design — achieved through close cooperation between the customer and the foundry — can assure the necessary tolerances and the lowest possible finished part cost. Modern techniques of production and inspection are used to insure top quality, dimensionally accurate castings.

The life of every motorist rides in complete safety on Malleable wheel hubs of unerring uniformity.

Uniformity Proven by Use

The final test of any part is how well it stands up in actual service. Under continuous cyclic and shock loading, the millions of Malleable wheel hubs, which are in service on the front end of every American-made car, have compiled an enviable record of proven uniformity. Another dramatic example of Malleable's uniformity is proved in the old adage "A chain is only as strong as its weakest link." Miles of Malleable chain, carrying tremendous loads year after year without failure, demonstrate the uniformity of every cast link.

Now techniques for controlling every element of Malleable production are the result of intensive research done by Malleable foundries in their continuing search for ways to make Malleable even more versatile and indispensable to industry.

More Information Available

Your copy of *Data Unit 103—Uniformity* — is available from any member of the Malleable Castings Council. If you prefer, write direct to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Badger Malleable & Mfg. Co., S. Milwaukee
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

STEEL

The CF&I Image offers you...

CLAYMONT
STEEL PLATES
made to many specifications

This giant is the Image of CF&I, reflecting CF&I's experience and versatility as one of the nation's leading primary producers of quality steels and steel products for industry.

He represents the quality controls that CF&I exercises during every step of manufacture—from ore to finished product—in the output of Claymont Steel Plates:

... **Carbon Steel Plates**—in standard ASTM and AISI specifications and special plates for special applications.

... **Alloy Steel Plates**—regularly produced by Claymont to ASTM specifications: A-387 • A-204 • A-202 • A-203 • A-225 A-302 • A-353 • A-357; also AISI specifications: 4140 • 4130. Inquiries are invited on other specifications to meet your requirements.

... **Stainless-Clad Steel Plates**—in AISI designations: 304 304L • 316 • 316L • 316Cb • 321 • 347 • 405 • 410 • 430—as well as in other specifications to meet individual requirements. Stainless cladding: from 5% to 50% of total plate thickness. Cladding inseparably bonded to carbon steel backing.

... **CF&I Lectro-Clad Nickel Plated Steel Plates**—a thick layer of metallic nickel, more than 99% pure, electro-deposited in thicknesses up to 30 mils onto carbon steel plate... provides positive protection against contamination and discoloration, at less cost than solid nickel.

... **Clay-Loy High Strength Low Alloy Steel Plates**—complies with ASTM specification: A-242. Ideal for structural and equipment applications because Clay-Loy Plates are 50% stronger than carbon steel plates of the same thickness, thus permitting weight savings up to 25% without sacrificing strength.

For complete information and order service, contact the CF&I warehouse or district sales office nearest you.

CF&I-CLAYMONT PRODUCTS: Carbon Steel Plates • Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Clay-Loy High Strength Low Alloy Steel Plates • Flanged and Dished Heads • Manhole Fittings and Covers • Fabricated Steel Plate Products • Large Diameter API Pipe

Claymont Steel Products

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa • Oklahoma City • Phoenix • Portland (Ore.) • Pueblo Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

6600

CF&I OFFICE IN CANADA: Montreal

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

Protecting downcomers with a heat-resistant concrete lining made with **Atlas Lumnite Cement**

A heat-resistant concrete lining, being gunited in place, solves the problem of abrasion in this blast-furnace downcomer system. Made with Lumnite calcium-aluminate cement and aggregates, this smooth, jointless concrete lining will withstand the abrasive attack of particles in the gas stream – extending the life of the steel structure.

In new installations or repairs, monolithic linings are easily and economically placed – by guniting, casting or troweling. Unit downtime is reduced because concrete reaches service strength in 24 hours.

Other applications in blast-furnace systems include foundation pads, blast main linings, stove domes and other areas where resistance to heat and corrosion are required.

For convenience, castables bonded with Lumnite cement are available from leading manufacturers of refractories. These are packaged mixtures, ready for use by adding only water. For more information, write Universal Atlas, 100 Park Avenue, New York 17, New York.

"USS," "Atlas" and "Lumnite" are registered trademarks

L-186

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany · Birmingham Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

When the urgent demands of our missile program required heat treating equipment far beyond conventional standards, Lindberg filled the need with this remarkable furnace installation. In a few months, this gantry-type, bottom quench, atmosphere furnace and its attendant facilities were designed, installed and put into operation at Lindberg Steel Treating Company, Melrose Park, Illinois, by Lindberg engineers and technicians. This accomplishment was no sudden inspiration, but was made possible by Lindberg's long years of experience in creating industrial heating equipment of every kind . . . heat treating, melting, brazing and enameling furnaces, high frequency units, ceramic kilns, pilot plant and laboratory furnaces . . . either electric or fuel fired. Whenever a product needs heat you can count on Lindberg to know how best to apply it. See your local Lindberg Field Engineer or write us direct. Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill.

LINDBERG heat for industry

Exacting Requirements?

Morton Manufacturing Company, of Muskegon Heights, Michigan, is a leading manufacturer of heavy duty machinery for the machine tool industry. Boring mills; drillers, planers, as well as special machine tools for national defense and the development of new processes are among their products.

for PRECISION . . . specify

ACIPCO

CENTRIFUGALLY SPUN STEEL TUBES

For almost 80 years, Morton Manufacturing Company of Muskegon Heights, Michigan, has been progressively building bigger and better machine tools.

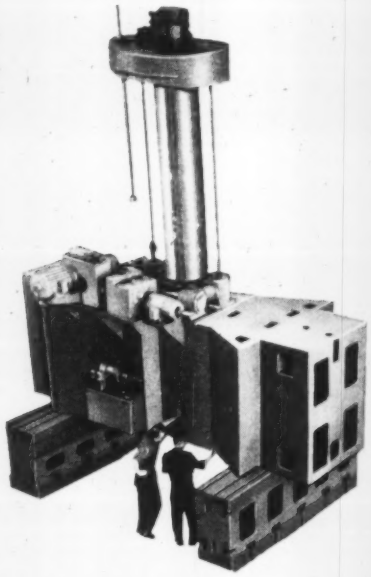
This ultra-modern turning and boring mill is 27 feet x 22 feet x 40 feet high, and weighs 525,000 pounds. Load capacity is 120,000 pounds. Driven with 210 horse-power, it is the first machine of its type wherein the work remains stationary.

Because of the herculean task this machine must perform, each component must be capable of precise performance under extreme loads. Morton wisely selected ACIPCO centrifugally spun steel tubing for the gigantic quill which houses and guides the rotary spindle. This tube is 24″ in diameter, 3″ in wall thickness and 17′6″ long.

ACIPCO centrifugally spun tubes have a dense, non-directional grain structure that has extra-ordinary strength and durability, and is more easily machined to close tolerances.

Whatever you may have in tubular applications, call on ACIPCO for perfect dependability. Our technical and manufacturing competence will serve your exacting needs.

MORTON



ACIPCO Centrifugally Spun TUBES

SIZE RANGE: Lengths up to 410″ have been produced to meet modern machinery requirements. OD'S from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steel, plain carbon steel and special analyses.

FINISHED: As cast, rough machined, or finished machined, including honing. Complete welding and machine shop facilities for fabrication.

SPECIAL PRODUCTS DIVISION

AMERICAN CAST IRON PIPE CO.

ACIPCO

BIRMINGHAM 2, ALABAMA

Who Buys Roebling Upholstery Spring Wire After You Do?

The end-user can hardly be expected to know a great deal about Roebling helical spring wire, border and brace wire, zigzag and no-sag wire, wire for automatic machines, lacing wire...

Thus, the qualities of uniformity, temper, tensile strength, size and finish that are yours whenever you use Roebling Spring Wire mean long life, resiliency under constant use (and abuse) where it counts the most...to those who buy Roebling Upholstery Spring Wire after you do.

For further information on the wide range of types, the consistent superiority and availability of these and other Roebling wire products, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Roebling...Your Product is Better for it

ROEBLING

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Subsidiary of The Colorado Fuel and Iron Corporation

OLD DUTCH NEVER COULD GET USED TO THEM TEMPERATURE TESTING GADGETS.
YEH? THAT'S THE SEVENTH ONE HE'S USED ON THIS HEAT---AND HE STILL DON'T BELIEVE IT.
HE'D BETTER GIT THAT HEAT OUTA THERE SOON OR THEY'LL BE HOOKIN' IT OUT OF THE PIT.
BOING
WHAM
KUEKES
THANKS TO
SAM HOLLINGSWORTH, MELTER
EMPIRE REEVES STEEL
MANSFIELD, OHIO

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WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

Magnefer and Syndolag Set Fast—Stay Fast

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

The Case of the Vanishing Taxes

Acton Chance, metalworking's answer to Richard Diamond, is back in the pages of STEEL this week. He's reporting on the nation's disappearing taxes. In competitive bidding between foreign and U. S. firms on government contracts, the U. S. companies get a 6 per cent break. Another 6 per cent differential is available to a firm in a labor surplus area. But much government work still goes abroad—in many cases, at a net loss to the U. S. Mr. Chance turns up one case where the loss—to be made up out of your pockets and ours—exceeded $30,000 (Page 100).

Economic Bellwethers Lead Upward March

Screw machines are expected to whir at a $485 million clip this year. That would give the screw machine products industry a year equal to 1957 and $85 million better than 1958. The National Screw Machine Products Association predicts a volume in excess of $500 million next year. This is significant since this industry's sales trends usually precede the trend of metalworking business by about three months . . . March orders for gears rose 17.2 per cent above the February level to the highest volume since May, 1957, reports American Gear Manufacturers Association.

Steel Wage Talks Get Underway

While David McDonald and R. C. Cooper led their bargaining teams into the year's first steel wage talks last week (Page 99), A. R. Maxwell Jr., president, Pittsburgh Steel Co., was laying it on the line to his firm's employees. "The company can afford a strike no more than its employees can," he said, since "a strike costs Pittsburgh $100,000 for each day it lasts." Don't expect the USW to strike one company and not the rest; it'll probably pursue its policy of not working without a contract.

Moonlighting Declines

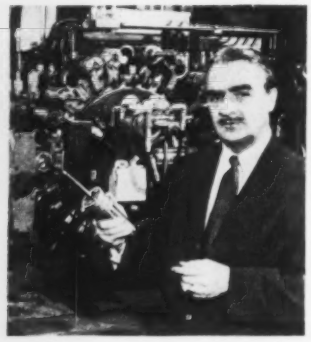
The trend toward multiple jobholding reversed last year, reports Commerce Department. About 3.1 million workers held two or more jobs in July, 1958. That's 500,000 fewer than a year earlier. Farm workers were the largest moonlighting group.

Steel Payroll Hits Record

The steel industry's March payroll climbed to a record $385 million—more than $51 million above the February total. The average hourly payroll cost

also advanced to a record $3.336. Fringe benefits cost the industry an additional 33.2 cents per manhour. More than 103,000 workers have been added to the steel industry's payroll since May, 1958—the recession low point.

Machine Tool Builders See Recession Clouds Lifting



Expect this year's new orders for machine tools to near the $500 million mark (vs. $374 million last year). That's the opinion of most builders questioned by STEEL at the spring meeting of the National Machine Tool Builders Association (Page 106). Francis J. Trecker, president, Kearney & Trecker Corp. (pictured), has reason to be optimistic. A multiplant corporation has informed K&T it will probably need about 60 of the firm's new Milwaukee-Matics in the next few years (Page 149).

Seven Routes to Sales Gains

Production executives aren't the only ones seeking to boost efficiency today; marketing managers are worried, too. The National Industrial Conference Board reports a majority of 131 manufacturing firms surveyed consider inefficiency to be their most pressing sales problem. Companies are trying these remedies: 1. Tightening controls on salesmen's activities. 2. Setting up training courses, conferences, and clinics. 3. Hiring more men. 4. Establishing standards to evaluate performance. 5. Improving bonuses. 6. Redistributing sales strength. 7. Trying new advertising approaches.

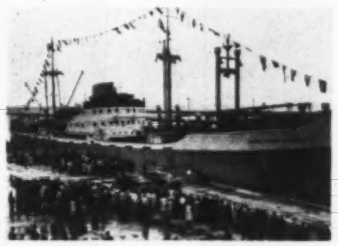
How to Combat Employee Fatigue

The man on the right has a common industrial ailment—fatigue. But it's not due to the oversize wrench he's carrying. It's probably because he's bored with his job. Psychological fatigue is one of the biggest drains on productivity. And it's extremely hard to conquer. But there are approaches that can take you a long way toward a solution (Page 114).

Firm Wins Damage Suit Against Strikers

Schacht Steel Construction Inc., Hillside, N. J., was awarded $5133 damages because a union broke a no-strike clause in its contract. A federal judge decided that Local 545 of the International Association of Bridge, Structural & Ornamental Iron Workers violated the no-strike provision by causing a 1½ day work stoppage when Schacht fired a machine tool operator for refusing to run a new type automatic electric welder without a helper. The judge said the question of supplying a helper was arbitrable under the law.

Who'll Get Competition from the Seaway?



Indicative of the foreign competition being felt after the St. Lawrence Seaway opened this month is this list of metalworking goods from England that arrived at Cleveland on *Prinz Willem III*, the first ship to come through the seaway: A lubrication system, musical instruments, electrical measuring instruments, anvil blocks, vertical diesel engines, gas water heaters, parts for high speed threading machines, aluminum castings.

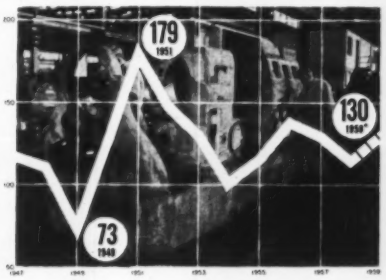
Why the Revolution in Car Buying Habits?

Sputniks and missiles have had a greater effect on the American car market than any other recent factor, claims Louis Cheskin, president, Color Research Institute, Chicago, in his new book, *Why People Buy*. He says the Russian satellites made us feel frivolous and impractical. When the Russian scientist commented that they built satellites while Americans developed fender fins, it hit us where it hurts. Example of the impact: The public's changeabout in its liking for gaudy, functionless ornamentation. Most decorative trim will be gone from autos by 1961, he predicts. The new book goes on sale soon.

On the Automotive Scene

Ford Motor Co. will make parts in Detroit for its new small car, the Falcon. But the car will probably be assembled in Lorain, Ohio . . . Willys Motors Inc. is making a new play for the passenger car market with a dressed-up version of its Jeep utility wagon. Called the Maverick Special, it lists for $1995 without freight and local charges . . . U. S. car producers have their assembly lines geared for 3,272,400 units in '59's first half, signaling a 12-month total of 5.95 million to 6.2 million units, indicates *Ward's Automotive Reports*.

Used Machinery Sales Start Climbing



February sales of used machinery were the highest for any month since April, 1957, reports Machinery Dealers National Association. The long term outlook is bright (Page 107). A 500 plant survey by Research Associates, Detroit, shows a projected annual market of $650 million.

Aluminum Gets Foot in Door of West German Building

Building with aluminum has shown sharp increases recently in West Germany, reports Alcoa's D. D. LaVorene. "Curtain walls and windows of

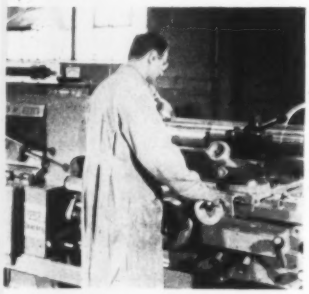
aluminum will make their way more strongly in Germany," says W. F. Wildschutz, managing director, Aluminum-Zentrale E.V., the German aluminum association. Per capita consumption of aluminum in West Germany is expected to hit close to 20 lb in 1961 vs. 10 lb in 1956. In the U. S., consumption is 25 lb per person.

Government Reports First Nuclear Production Data

The market for atomic energy products exceeded $100 million in 1957, reports the Commerce Department in its first survey of the nuclear industry. Breakdown: Reactor vessels and tanks—$11 million; accessory instrumentation for reactor control—$9.5 million; heat exchangers—$8.3 million; pumps—$6.2 million; valves—$7.8 million; radiation detection and monitoring devices—$17.5 million.

Lathemaker Moves Against Obsolescence

Here is a lathe that can be adapted to meet changing production requirements and improving technology. It's the new Clearing-Axelson Blue Chip that features a welded steel headstock and bed for the rigidity needed to machine high strength alloys with carbide and ceramic cutters. Available with any size or type of bed, it can be adapted to power speed selection and perhaps numerical control later (Page 144).

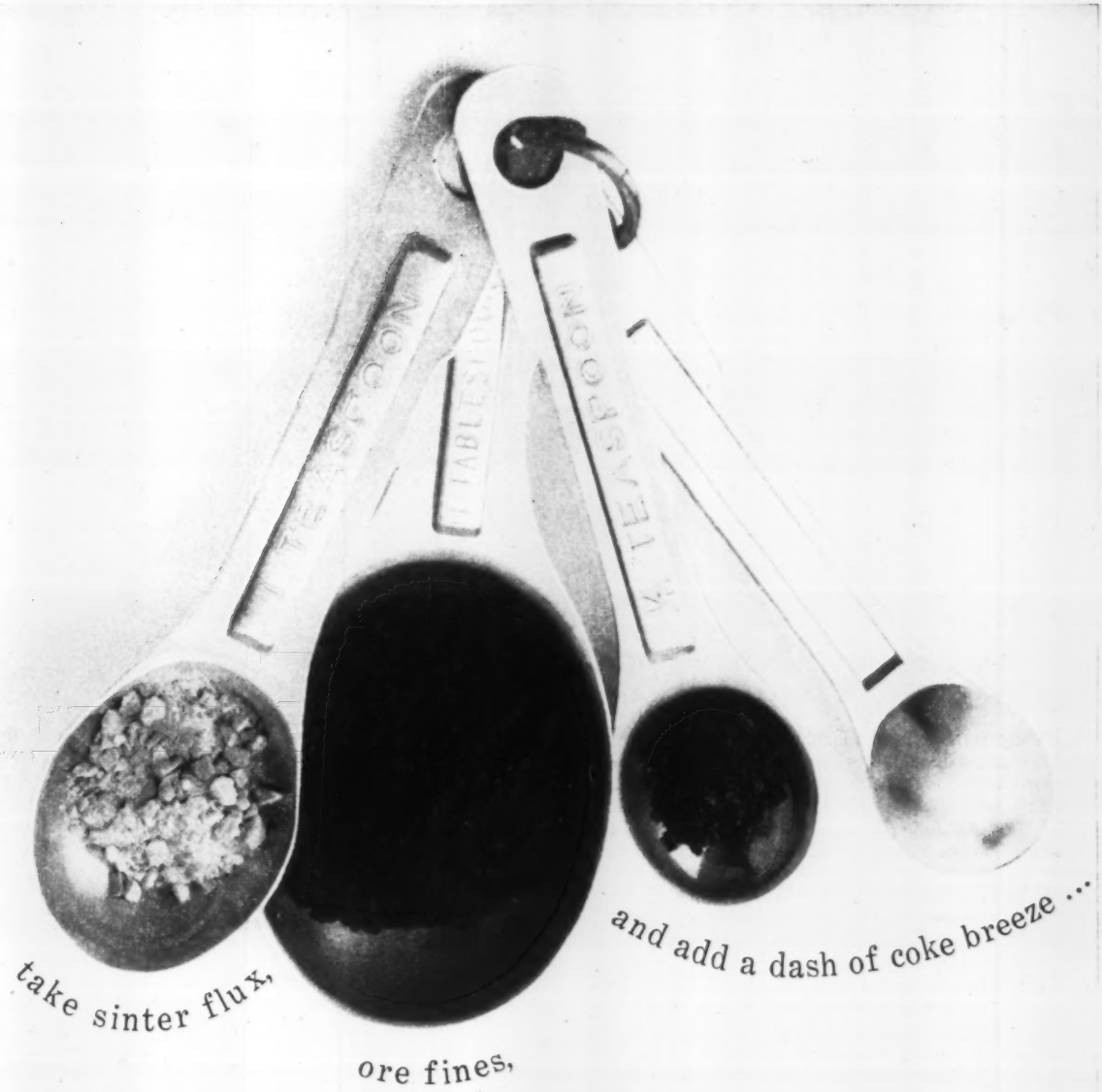


Bethlehem, GM Report Profit Gains

Bethlehem Steel Corp. had first quarter net income of $49.5 million, up from $24.8 million a year earlier but below the $57.6 million reported in 1958's last period. Bethlehem expects the industry operating rate to average 95 per cent in the second quarter and 60 per cent in the third quarter . . . General Motors Corp. reports net income of $293 million in the first quarter vs. $185 million in the year-earlier period.

Straws in the Wind

Small businesses got 31 per cent more government contracts during 1959's first quarter than they did in the year-earlier period . . . Inland Steel Co. says it can't get as many workers as it needs at its big Indiana Harbor Works; it has resorted to field recruiting for the first time since 1957 . . . National Steel Corp. plans to finance its $300 million expansion through the sale of $80 million worth of first mortgage bonds due in 1989 . . . About 155 million lb of plastic will be formed into sheets this year (vs. 140 million last year), predicts Society of the Plastics Industry . . . One oddity coming out of hearings on Senator O'Mahoney's "Price Notification" bill: David McDonald took a stand against it while Walter Reuther supports it. The bill is not expected to become law.



That's exactly what Inland's technical chefs will do when its giant, new sintering plant is completed in June. A single day's mix—4300 tons of iron ore particles, 500 tons of crushed limestone, 250 tons of fine coke—will bake a cake of clinkers which can be fed directly into blast furnaces. Result—better, faster reduction of raw iron ore to pig iron, blast furnace production upped 10%—*more and more Inland steel to feed the hungry production lines of fast-expanding Mid-America manufacturing!*

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WHY ARMCO 17-7 PH STAINLESS HELPS ASSURE PRECISION PERFORMANCE AND LOW COST FOR ELECTRIC SWITCHES

A leading manufacturer of subminiature, small industrial and commercial, and precision electric switches recently specified Armco 17-7 PH Stainless Steel for the center blades and patented rolling springs in many of their products. A non-ferrous spring material was replaced with 17-7 PH Stainless because its unusual characteristics offered the opportunity to improve the reliability and performance of their switches at low cost. The mechanical life of one part was increased from 30,000 to 30,000,000 cycles!

Using this special material in the hard temper condition, they obtained:

Ultimate tensile strength of 220,000 psi
Tensile yield strength of 190,000 psi
Fatigue strength of about 85,000 psi at 10^7 cycles
Good corrosion resistance, much superior to that of the hardenable chromium grades of stainless steels.

Where even greater strength is needed, Armco 17-7 PH hard temper (Condition C) sheet and strip can be heat treated to a typical ultimate tensile strength of 265,000 psi. And, if parts require extensive fabrication, they can be easily formed from annealed 17-7 PH then hardened to high strength and hardness.

Improve the reliability and performance of your products by using 17-7 PH Stainless Steel for parts that require high strength and hardness up to 900 F, good corrosion resistance, and excellent fabricating characteristics. Armco 17-7 PH is available in sheets, strip, plates, bars, and wire; a companion grade, Armco 17-4 PH in bars, wire, and billets.

Just fill out and mail the coupon for complete information on the properties and fabrication of these special stainless steels.

Armco Steel Corporation
1609 Curtis Street, Middletown, Ohio

Send me information on: ☐ Armco 17-7 PH Stainless Steel ☐ Armco 17-4 PH Stainless Steel

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Labor Bill—Only a Start!

The three year parade of several hundred witnesses before Sen. John L. McClellan's Labor Rackets Committee at long last has resulted in the passage of labor legislation (the Kennedy-Ervin Bill) by the Senate.

Witnesses related endless stories of the misuse of funds, corruption, political graft, gangsterism, and the irresponsible use of tremendous power and influence.

The Senate bill—yet to pass the test in the House—plugs some of the loopholes left in the Taft-Hartley Act (passed 12 years ago).

Among other things, it requires unions to make yearly financial reports to the secretary of labor and union members; to hold democratic elections; to keep racketeers out of office; and to report on loans to officers. It bars picketing to force an employer to recognize a union if he has already recognized another union.

Even if the Kennedy-Ervin Bill succeeds in the House in its present form, it will leave much to be desired in clearing up some of the vicious labor practices, such as the secondary boycott, uncovered by the McClellan Committee.

And it will not go far enough in placing the control in the hands of union membership where it belongs. As evidence of the need, an independent survey indicates that many members of the United Steelworkers are fed up with the spiral of prices and taxes accompanying each wage increase.

Yet USW President Dave McDonald is asking the steel industry for higher wages and other concessions that do not make sense to the rank and file.

As Harold J. Ruttenberg (former research director of the USW and now president of the Stardrill-Keystone Co.) said last week: "What the steel unions need more than higher wages is full time work and steady pay the year around."

So far, no union leader has been willing to exercise true statesmanship in providing what members really want. So it is up to Congress to enact legislation that will be fair to the workingman, to management, and to the public.

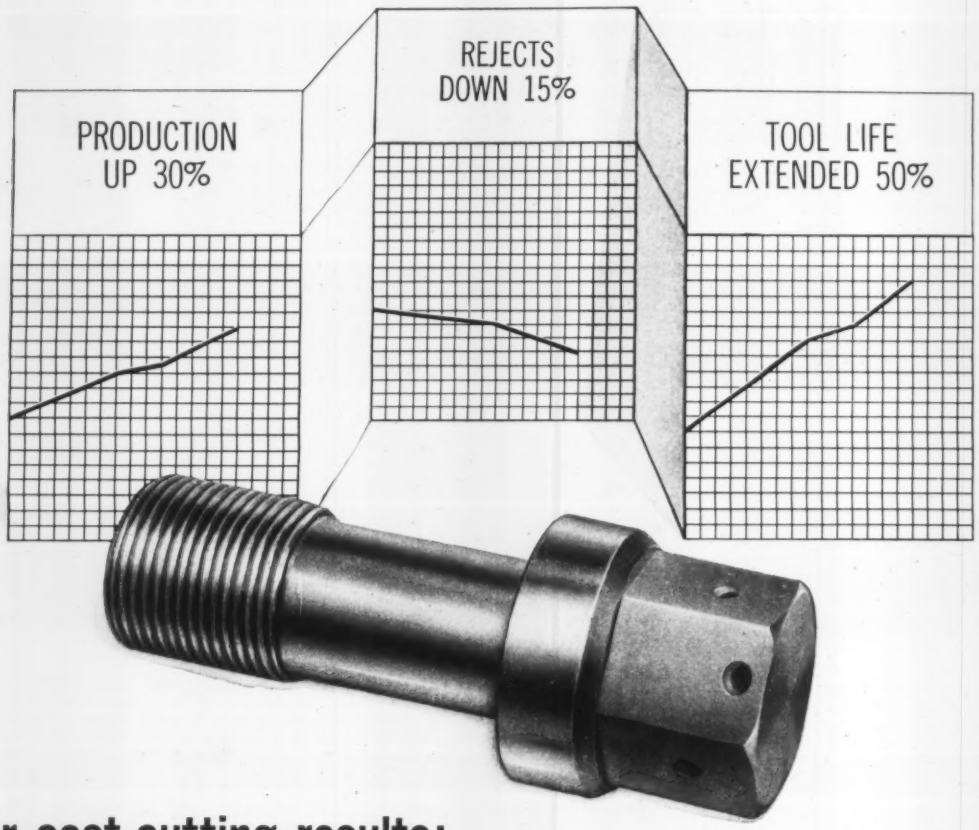
The watered down Senate bill is only a start!

Irwin H. Such

EDITOR-IN-CHIEF

Value analysis boosts production 30%

This was the outstanding result when a metalworking company studied and evaluated production of piston pin bolt heads with a Ryerson representative. The Ryerson specialist recommended Rycut® 40—the world's fastest machining alloy steel in its carbon range.



Other cost-cutting results:

In addition to boosting production, this risk-proof Ryerson alloy reduced rejects 15% . . . increased tool life 50% . . . and gave parts a better finish. Ryerson value analysis of materials and methods may help solve some tough problems for you. Contact your nearby Ryerson plant for details.

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STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

Management's Cooper (left), labor's McDonald trade views, show . . .

Steel, Union Far Apart as Talks Open

WHAT HAPPENS when the irresistible Mr. McDonald meets the immovable Mr. Cooper?

That's what newsmen wondered when they crowded into New York's Hotel Roosevelt last Tuesday for the opening of contract talks between the steel industry and its union. After the first day's session, they were still wondering. This much was clear:

- Both sides want a speedy, strike-free settlement that's noninflationary and fair to everybody—industry, stockholders, employees, customers, and the public.
- Neither side has retreated an inch from previously announced, seemingly irreconcilable positions.

As 162 negotiators for labor and management moved into the Roosevelt's ornate Palm Terrace, two men stood out: David J. McDonald, president of the United Steelworkers, and R. Conrad Cooper, executive vice president-personnel services of U. S. Steel Corp.

• **Battle Lines Drawn**—Mr. McDonald declared that the USW sees "deficiencies" in programs adopted in 1956—problems related to grievance procedure, seniority, rates of pay, weekend premiums, and other benefits. Insurance and pension programs require "further substantial improvement," he asserted, and the SUB (supplemental unemployment benefits) program has "many inadequacies." He emphasized: 1. The need for "substantial improvement" in wages. 2. The need for greater employment.

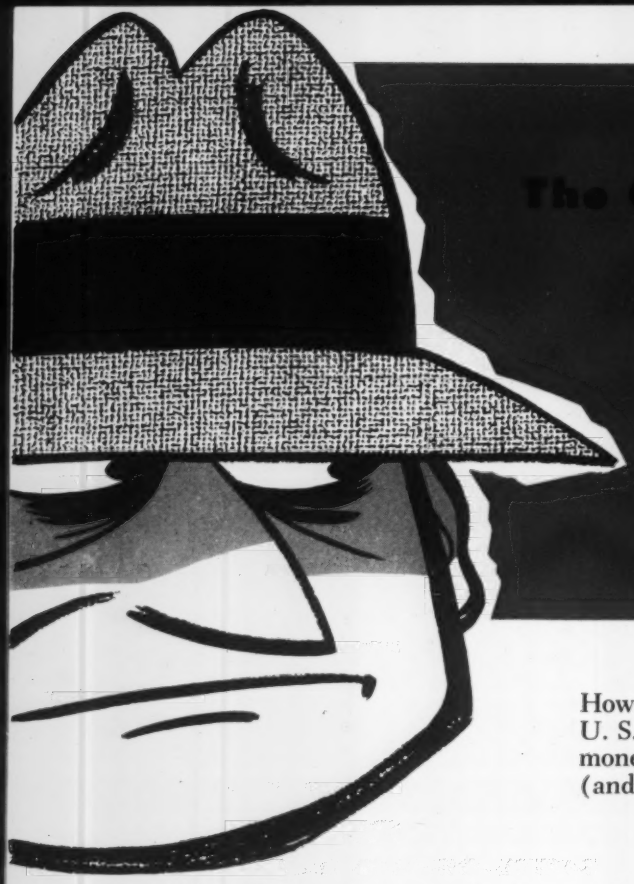
Mr. Cooper, leader of the industry's bargaining team, answered by restating the companies' position: "The one and only sure way we know of to accomplish this result (a noninflationary settlement) would be to continue present wages and other benefits, without change, for one year beyond June 30, 1959."

• **Industry's Stand** — R. Heath Larry, a U. S. Steel vice president, declared: 1. Rapid increases in employment costs are a principal cause of inflation. 2. Steelworkers are better off than most manufacturing workers. 3. Their gains have outstripped increases in productivity. 4. They're pricing themselves out of markets here and abroad. 5. Wage increases can't be met out of profits.

Arthur J. Goldberg, general counsel of the union, argued that steelworkers deserve higher wages because of higher manhour output.

• **White House Warning** — Both Messrs. McDonald and Cooper addressed themselves to the question of government intervention. Asked about President Eisenhower's plea for "statesmanship" and warning that the U. S. "cannot stand still and do nothing," Mr. McDonald referred to his prepared remarks: "It is up to us to conduct ourselves in such a way as to reach an accommodation of our various interests which will be fair." Said Mr. Cooper: "We would like to do the job ourselves. It's our responsibility and we'll discharge it."

After the first week's meetings between the USW and the 12 participating companies, the talks will probably recess. When they're resumed later this month, the industry's four man team (Messrs. Cooper, Larry, J. H. Morse of Bethlehem Steel Co., and H. C. Lumb of Republic Steel Corp.) will knuckle down to some hard bargaining with the union's big four (Messrs. McDonald, Goldberg, Howard Hague, and I. W. Abel).



The Case of the

VANISHING TAXES

How much does the government save when it awards U. S. contracts to companies overseas? It may actually lose money because it won't get taxes from the American firms (and their employees) that didn't win the job

I TRIED to keep my eyes on a portrait of George Washington directing the battle of Yorktown, but they kept drifting to the breastwork on display at the receptionist's desk.

This was the office of a U. S. official, and I, Acton Chance, private investigator, must observe decorum or I wouldn't get my first interview in my first government case.

It all started only yesterday. I had let the phone ring until I finished my 4 o'clock Dixie cup of bourbon.

"Mr. Chance, I'm a government official and want you to investigate a matter for us. We liked your technique in the Case of the Vanishing Jobs (STEEL, Apr. 6, p. 99). This problem is similar. Call it the Case of the Vanishing Taxes. Phone (censored). He's waiting to vouch for me. Then ring Operator 35 to get me back."

The phone clicked, leaving my mouth open to emit the bourbon fumes. I checked. I called back.

"Chance, we're losing tax revenues."

I mumbled about profits being off, about fudging on deductions.

"We know all about those. The disappearing taxes I'm talking about are the ones we're no longer getting from companies and people that do government work. We want you to find what's wrong."

I took the case. I even took a date with that receptionist. From her, from U. S., and industrial officials, I finally had my facts. This is my report.

In competitive bidding among foreign and U. S. firms on government contracts, the U. S. companies get a 6 per cent break. The lowest American bid may be 6 per cent above the foreigner's. Under the Buy American Act, the U. S. firm wins. Another 6 per cent differential is available to a company in an area designated labor surplus by the U. S.

The basic and first 6 per cent differential has the loss of tax revenue as one of its considerations. But that's not the real reason for the differential setup. Originally, the Buy American concept was anti-depression in nature. From 1934 to 1954, the differential was 25 per cent. It was lowered to 6 per cent five years ago by Executive Order.

William H. Speck, associate counsel, Bureau of Yards & Docks, U. S. Navy, says: "Maybe those who wrote the Executive Order on the 6 per cent figure considered the loss of tax revenues, but in procurement we don't take them into account."

And U. S. procurement officers can't. Their directives are clear, and they have no choice but to give contracts to companies abroad if bids are low enough.

But the accompanying work sheet gives a typical case of how the government loses taxes even when the winning foreign bid is far below the American. In this case alone, we suffered a net loss in revenues of $30,000. What's more, the government also lost on direct income taxes from the suppliers of goods and services all the way back. The U. S. also lost on social security, excise, and other indirect taxes.

As I finished putting my report into code to be transmitted to my client, I thought that this loss to the government is coming out of your pockets and mine. I shook my head. It was 30 minutes before my 4 o'clock bourbon, but I filled a Dixie cup to the brim anyway.

The Facts As I Found Them

ACTON CHANCE—
Metalworking's Private Eye

Domestic Company	Foreign Company
BIDS ON NAVY SHIP PLATE CONTRACT	WINS SHIP PLATE CONTRACT
IS UNDERBID	SAVES NAVY **$37,000** WITH LOW BID
DIRECT TAXES LOST: **$67,000** (Plus Other Indirect Taxes)	U.S. INCOME TAX: **None**

So-o----

That's Good!

That's Bad!

Net Loss to U.S. $30,000

That's Terrible!

Guess Who Pays Deficit?

Hey---- That's us!

An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio

TVA Ups Tempo in Buy American Fight

PRESSURE on the Eisenhower administration in the "Buy American" battle is reaching lid-popping proportions.

Tennessee Valley Authority's latest request for bids on an estimated $50-million-plus worth of new generating equipment may provide the test. Here's why:

• **Half Foreign, Half Domestic**—On Apr. 10, TVA invited six firms to bid on 16 turbogenerators for delivery starting Sept. 1, 1962. Three of the companies are foreign; three are American—Allis-Chalmers Mfg. Co., General Electric Co., and Westinghouse Electric Corp.

By the middle of last week, none of the American firms had submitted bids—they're due in by May 26. It's rumored that they will not submit bids in a move to spotlight the situation.

• **Background of Hassle**—Early this year TVA bought a 500,000 kw turbogenerator from C. A. Parsons Ltd., England, one of the foreign firms invited to bid again. (The others: English Electric Co. and Brown Boveri Corp. of Switzerland.) TVA told the American builders that it would pay 20 per cent more for the equipment to keep the work at home. But Parsons' price was 50 per cent below that of GE and Westinghouse.

In March, GE and the National Electrical Manufacturers Association petitioned the Office of Civil & Defense Mobilization not to honor bids on heavy, electric power producing equipment from foreign companies.

The domestic equipment builders need business badly.

They contend that the low priced foreign competition may hurt their industry so that it could not produce equipment needed in an emergency.

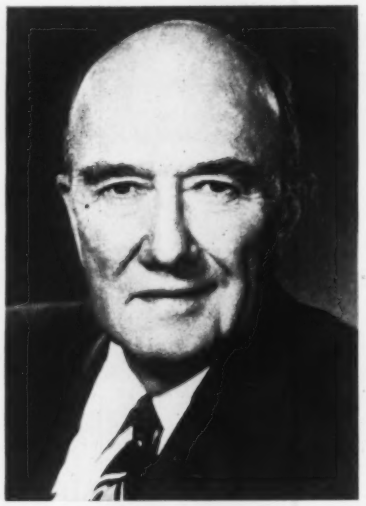
• **No Decision Yet**—A ruling on the petition has been expected "momentarily" for weeks from the OCDM. But the problem is not easily resolved. Foreign competition is giving the administration a new headache almost every day. "Making an exception in this case," says one source, "is almost certain to bring in a whole new batch of industries wrapping themselves in national security in their tariff requests."

One thing seems almost sure: The foreign firms will get the order even if the American manufacturers submit bids—unless the OCDM decides not to honor the foreign bids. A differential on the order of 30 per cent would seem almost impossible to overcome. (IUE President James Carey urged that the three U. S. companies make "realistic" bids to get the jobs.)

• **Complicating TVA Problem** — The bids asked for are not commitments to buy. TVA estimates it'll need 900,000 kw in new generating capacity each year to take care of its growth. It's now appealing to Congress to sell revenue bonds in the open market to finance the expansion (a similar appeal failed last year).

One Capitol Hill source says that orders for turbine and delivery dates won't be determined until financing arrangements have been completed.

Big Steel Has New President



C. F. Hood retires

W. F. Munford steps up

THE WORLD'S BIGGEST steel producer got a new chief last Tuesday. Walter F. Munford, 58, replaced retiring Clifford F. Hood, 65, as president and chief administrative officer of U. S. Steel Corp. Roger M. Blough continues as chairman and chief executive officer.

Mr. Munford was executive vice president-engineering and research. He worked in American Steel & Wire Div. mills during summer vacations while attending Worcester Polytechnical Institute and Massachusetts Institute of Technology. In 1923, he started full-time employment with the division as an open hearth helper. He became superintendent of the open hearth department at Newburgh Works, Cleveland, in 1927. He moved up through the ranks to become president of AS&W in 1953, and assistant executive vice president-operations for the corporation in 1956.

Married in 1924, he has two sons. He's a member of the American Iron & Steel Institute and Lambda Chi Alpha fraternity. He's a Mason.

Mr. Hood, a 40 year veteran of the steel industry and president of U. S. Steel since 1953, stepped down upon reaching (in February) the corporation's normal retirement

age. (This surprised some industry observers who expected him to hold the post until after this year's labor negotiations were completed.) He will continue as a member of the board and executive committee of the corporation.

A former Illinois farm boy, Mr. Hood earned an electrical engineering degree at the University of Illinois and began his career with U. S. Steel in 1917 as an operating clerk in the electrical cable plant of AS&W. He became vice president-operations of AS&W in 1935 and its president three years later. In 1951, he became executive vice president-operations for the corporation and was elected president on Nov. 25, 1952.

Wages Cloud Ore Situation

"Can we continue to expand our iron ore operations in this country, or will we have to expand faster in Canada and South America to maintain our strong competitive situation?" asked Walter A. Sterling, president, Cleveland-Cliffs Iron Co., Cleveland.

Mr. Sterling's answer: "If labor costs increase, we must limit any further expansion to taconite and jasper operations in the Lake Superior area and Canada . . . and to foreign direct shipping ores."

Wages in steel are considerably higher than they are in any other basic industry. Underground mining jobs have an even higher average than steel's. Mr. Sterling declares: "I feel that steelworkers should see that they are pricing underground ores out of competition.

"We have come a long way in partially offsetting increased labor costs," he continues, "through reducing overhead and improving production methods. But the productivity of labor has not increased commensurate with our expenditures to improve things. Further increases in labor without an adequate increase in ore prices may force us to curtail production from underground mines."

Mr. Sterling emphasized the growing threat of foreign competition now that the St. Lawrence Seaway has opened. Last year, 25 per cent of the ore consumed in the U. S. was from foreign mines.

Vanadium-Alloys Finishes Expansion

A $3.5 MILLION expansion of steel producton, finishing, and delivery facilities has been completed by Vanadium-Alloys Steel Co., Latrobe, Pa.

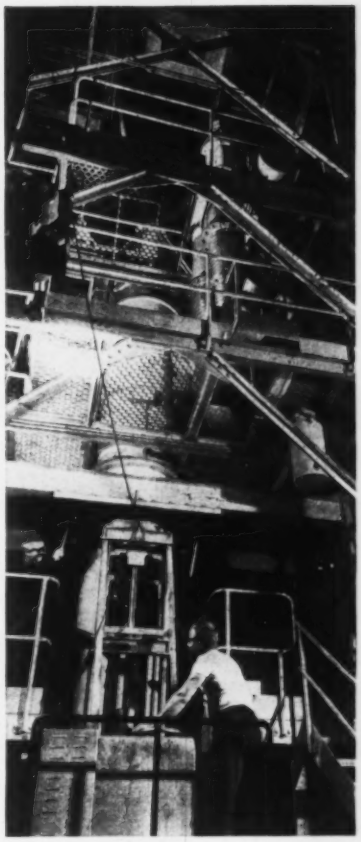
The program includes a new vacuum melting furnace; a continuous, controlled atmosphere annealing furnace; and two rolling mills (a 16 in. and combination 10 and 12 in.) at the Latrobe plant. Also completed is a 2000 ton, vertical, hydraulic forging press at the firm's Colonial Steel Co. Div., Monaca, Pa. Auxiliary heating and handling equipment and test and inspection facilities have been installed at both sites. The new buildings cover 97,000 sq ft.

• **Furnace Outstanding**—The consumable electrode, vacuum melting furnace (capacity: 4 million lb annually) features flexibility of ingot size (diameters: 9 to 24 in.; weights: 500 to 8500 lb). Uniformity of arc control is maintained.

Its vacuum pumping system is highly efficient. Pressure is kept below 5 microns—equivalent to a vacuum containing but 1 atom in a volume that contains 152,000 atoms at normal pressure. Other furnaces run at 50 to 100 microns.

The furnace was designed by Vanadium-Alloys and built by Consolidated Electrodynamics Corp., Rochester, N. Y. It uses interchangeable copper ingot molds which are expected to last 100 to 500 heats. Cost: $2000 to $4000 each.

• **Not for Tools**—Designed principally to make bearing steels and high alloy material for aircraft and missiles, the furnace will not produce steels for dies or cutting tools. Dr. George A. Roberts, vice persident, technology, says the notion that all tool steels will be vacuum melted within a few years is erroneous. He doesn't think users will pay a premium for properties they don't really need.



Vanadium-Alloys Steel Co.'s new vacuum melting furnace

West Canada Gets Mill

Construction of Western Canada's first iron and steel smelter will start immediately at Kimberley, B. C. It will mark the first stage of an integrated iron and steel operation by Consolidated Mining & Smelting Co. of Canada, Montreal, Que., for the production of pig iron, steel ingots, and rolled steel products. Planned annual capacity: Over 100,000 tons. Cost: More than $20 million.

Large reserves of iron tailings, coal, limestone, and hydroelectric power in the area provide an ideal climate for electrothermic iron and steel production.

The initial installation includes sintering and furnace feed facilities (annual capacity: 100,000 tons of steel) and one electric furnace (annual capacity: 36,500 tons of pig iron). Production is scheduled for early 1961.

The company plans to add a second large furnace, oxygen blown converters for steel ingot production, and fabricating facilities in the near future.

Why Companies Failed in 1958

Cause	Manufacturers	Total Business
Incompetence	53.2%	44.1%
Lack of experience	40.2	47.9
Neglect	2.3	3.4
Fraud	2.1	2.1
Disaster	1.5	1.3
Cause unknown	0.7	1.2
Total	100.0	100.0
Number of failures	2680	14,964
Average liabilities	$91,641	$48,667

Source: Dun & Bradstreet Inc.

BUSINESS FAILURES reached a postwar high of 14,964 (with liabilities of $728 million) in recession-troubled 1958. Failures among manufacturers increased for the second consecutive year, says Dun & Bradstreet Inc.

The shock of the economy's downturn was felt in the first half when casualties climbed 14 per cent above those in the 1957 period. In the second half, the rate of increase was down to 4 per cent.

• **Trend Turns Down**—The downtrend stretched over into the first quarter of this year—3697 businesses, with liabilities of $197 million, closed. Compared with 1958's first quarter, it means an 8 per cent decline in number of failures, a 2 per cent decline in dollar liabilities.

Dun & Bradstreet's figures do not include all business closings, but only those firms involved in actions likely to end in losses to creditors.

• **New Firms Hardest Hit**—Businesses in their first five years of operation still dominate the casualty list, accounting for 57 per cent of all casualties. But the rate among firms over ten years old is also up—from 11 per cent of the total in 1948 to 21 per cent in 1958.

Geographically, most failures last year involved businesses in large industrial cities and were concentrated in four regions: New England, Middle Atlantic, South Atlantic, and East North Central states.

In relation to the operating business population, the failure rate remained moderate—56 per 10,000 enterprises. That compares with 70 per 10,000 in 1939 and the record 154 per 10,000 in 1932.

AEC Offers Safe Isotope

The Atomic Energy Commission is offering 1 million curies of tritium to industrial users. Demand for the gas (an isotope of hydrogen) has been on the uptrend the last two years.

Tritium has a half-life of 12.5 years and emits low energy beta particles with no hazard of penetrating gamma radiation. The beta particles emitted are identical to the electrons which bombard the screen of a television set.

It's being used to make luminous instrument dials, runway markers, emergency exit signs, and darkroom lamps. New applications being developed: Experimental fluorescent light tubes which require no starters or transformers and tracer devices for oil well stimulation and refinery operations.

Licensed users may buy it from the AEC's Oak Ridge, Tenn., National Laboratory at $2 per curie.

Uranium Output Climbs

Domestic production of uranium last year jumped to 24,837,325 lb of U308 concentrate (vs. 16,964,262 lb in '57), reports the Atomic Energy Commission.

Twenty-three producing mills were in operation vs. 16 in 1957.

Production by states: Colorado, eight mills produced 5.8 million lb; Utah, four mills turned out 7.8 million lb; New Mexico, six mills produced 7.2 million lb; five mills in Arizona, Washington, South Dakota, and Wyoming produced 4 million lb.

Cans: New Aluminum Target

Aluminum cans may capture 20 per cent of the metal container market within ten years, predicts R. F. Newcomb, vice president, commercial development, Canco Div., American Can Co., New York. Economics and problems arising from the use of a light gage metal are major hurdles.

Mr. Newcomb reports soldering problems suggest that seamless processes, such as extrusion, drawing, and ironing, are most suitable for aluminum cans. Prices approach those of tin plate on a gage for gage basis, but the light metal containers must be heavier gage to resist buckling and paneling.

Gas Group Cites Progress

The Liquefied Petroleum Gas Association cited three major advances in 1958 at its 28th annual meeting and show in Chicago: 1. Reduction of freight rates on L-P gas (up to $250 per tank car, or 36 per cent). 2. A new code, offering one set of standards for all types of home fuel gases. 3. Significant steps taken toward uniform technical standards for installing home gas equipment.

When to Replace Your Equipment

"ONE of the greatest hidden risks in production operations is the high cost of keeping equipment that is useful but no longer profitable," says Jones & Lamson Machine Co., Springfield, Vt.

The company has developed a capital goods replacement formula which could help you avoid that risk and also help you make decisions.

• **The Kernel**—The formula puts a proposed replacement project in terms of avoidable costs which would be incurred by postponing an equipment purchase for one, five, or ten years. It projects costs or savings over the life of new equipment and allows for additonal costs created by inflation. Built into the computation are provisions for increases in labor and other costs, as well as estimated new equipment prices for the related periods.

• **Simplified Forms**—The operation of the formula is shown in the exhibits below. In the replacement data sample, the descriptions, ages, and worths of old and new machines are detailed. All avoidable costs or savings are listed in the cost comparison section. Computations of avoidable costs and evaluation ratios are contained in the exhibit to the right.

Though not shown, two tables are used with the formula which project indexes of past trends. One projects wage and material cost factors, and the other projects replacement cost factors for metalworking machinery. Both are based on Bureau of Labor Statistics reports.

• **Aids Comparison Making**—With the tables, you can rate one replacement against another by establishing the ratio of avoidable costs to the cost of new equipment. Caution: The ratio should be drawn for several periods. A project may show a high ratio for one year, but over another period, the ratio may shift to favor a different project.

The company says the formula cuts through limitations and fallacies found in many commonly used formulas. It does not analyze a replacement project in terms of the rate of return on investment, the time it will take to return the

Sample Replacement Data

Name of Machine	Old Equipment: 4 Engine Lathes Without Bar Equipment*	New Equipment: 2 Turret Lathes with Hydraulic Drive & Bar Equipment**
Type, size, & horsepower	14" x 30"—7½ HP	Ram—5-2½—20 HP
Year manufactured	1939	1959
Year acquired	1939	1959
Original cost	$25,464	$54,000
Present book value	$ 0	$54,000
Present market value	$ 400	$54,000
Estimated life of usefulness		15 Years

Cost Comparison (One Year)

	Avoidable Costs or (Savings)
1. Direct labor	$15,000
2. Indirect labor	2,000
3. Fringe benefits	4,500
4. Spoilage in manufacture	1,000
5. Maintenance—ordinary	100
6. Maintenance—repair	400
7. Power	(600)
8. Perishable tools	
9. Taxes & insurance	(1,600)
10. Depreciation	(3,600)
11. Other (list):	
12. Total avoidable costs for one year	$17,200

*One operator—each machine. **One operator only—runs both machines.

Avoidable Costs Incurred By Postponing Replacement

	For 1 Year	For 5 Years (2)	For 10 Years (2)
Avoidable costs From current cost comparison (From Line 12)	$17,200	$17,200	$ 17,200
Avoidable costs From current cost comparison $17,200 times number of years	.....	86,000	172,000
Factor for projected increase in labor & material cost $17,200 times 27.63% (1)	.....	4,752	.....
$17,200 times 62.90% (1)	.....	.....	10,818
Factor for projected increase in cost of new equipment $54,000 times 38.0% (1)	.....	20,520	.....
$54,000 times 76.3% (1)	.....	.....	41,202
Total avoidable costs incurred	$17,200	$128,472	$241,220
Proposed investment in new equipment	$54,000	$54,000	$54,000
Ratio of avoidable costs to costs of new equipment (For rating one replacement project against another)	31.9%	237.9%	446.7%

(1) Jones & Lamson projections based on Bureau of Labor Statistics reports.

(2) Beyond first year.

investment, or the period needed to obtain a favorable cash flow. Such concepts, Jones & Lamson says, ignore the avoidable costs which would mount if a replacement decision is delayed.

Jones & Lamson has four-page forms available which include the two samples reproduced on Page 105, the projection of indexes, and instructions which could help you solve replacement problems.

Machine Tool Sales Pick Up

Builders are optimistic. They expect the uptrend to continue. But losses in the world market are still a recovery brake

MACHINE TOOL builders now can smile when you ask: "How's business?" Their industry has fought its way off the recession floor, and all bets are for a "fair" year in 1959—a considerable improvement over a dismal 1958.

At the spring meeting of the National Machine Tool Builders Association, members seemed to be convinced that a real upturn has taken place. Estimates of this year's new orders ran $500 million, up from 1958's $374 million.

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That's the way N. M. Forsythe, president, National Automatic Tool Co. Inc., Richmond, Ind., and chairman of the association's taxation and renegotiation committee, summed up the writeoff crisis. Pointing at the more liberal allowances permitted by nearly every other government, Mr. Forsythe says the U. S. system acts as a "powerful brake on plant improvement and modernization."

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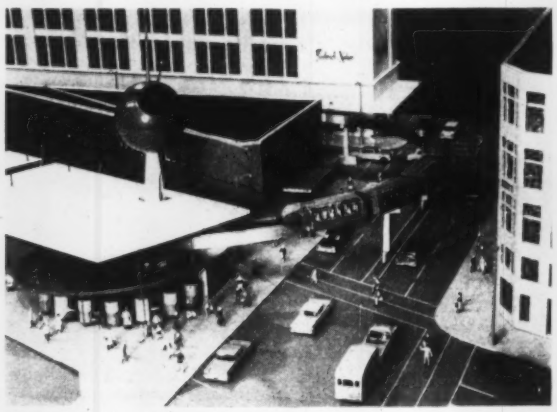

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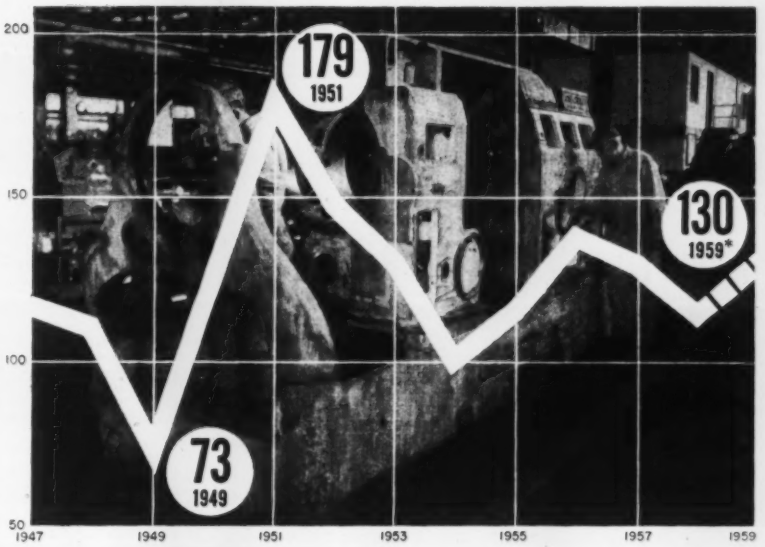
Sales of Used Machinery Heading Up



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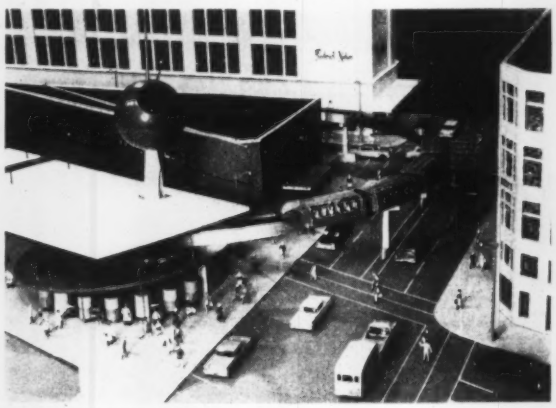

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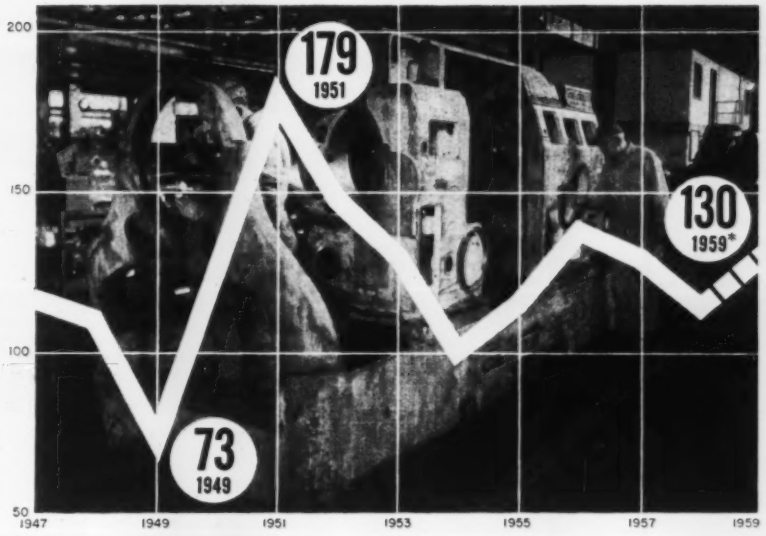

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Vinson Attacks Aircraft Industry

Year	Firm	Per Cent Profit on Own Invested Capital	Government Furnished Property
			(in millions)
1953	Boeing	152	$101
	Douglas	148	77
	Fairchild	214	26
	Grumman	240	25
	Lockheed	239	84
1954	Martin	81	38
	North American	802	92

THE AIRCRAFT industry is taking its lumps from three Congressional committees these days. The figures above illustrate what leading "antiprofiteering" legislators are telling their fellow members on Capitol Hill.

Rep. Carl Vinson (D., Ga.), chairman, House Armed Services Committee, indicated that profits of the aircraft industry are "unconscionable" by this measuring stick. He testified before the House Ways & Means Committee, holding hearings on the administration's request to extend the Renegotiation Act for 27 months after it expires June 30.

Barron Grief of the Aircraft Industries Association replied to Representative Vinson: Profit on defense contracts is being predetermined by the Renegotiation Board. To prove his case, Mr. Grief reported Boeing's ratio of earnings to sales before federal income taxes changed only 0.01 per cent from 1952 to 1954 after renegotiation. Before renegotiation, the fluctuation was a decline of 0.54 per cent from 1952 to 1953.

Rep. Thomas Curtis (R., Mo.) told the committee that the industry has no chance to build up its capital contribution as long as the board refuses to allow greater profits.

Prewitt Complains of Subcontracting

The Government Procurement Subcommittee of Sen. George Smathers (D., Fla.) has finished hearing small firms complain of their inability to gain major component subcontracts from the big missile primes.

A smaller member of the industry took on his big brother before the Smathers' committee: "The weapon system concept has been troublesome and discouraging to small business concerns such as mine," charges Richard Prewitt, president, Prewitt Aircraft Co. He thinks "increased costs, duplication of effort and equipment, and increased delivery time" result when the big primes get the right to control all the funds for a project.

Hokanson Cites Case History

Rep. F. Edward Hebert's (D., La.) Special Investigations Subcommittee is checking the value to the defense effort of the weapon system concept (principally the Air Force's mode of giving the complete contract for an advanced weapon to one contractor or a group of "associate" contractors).

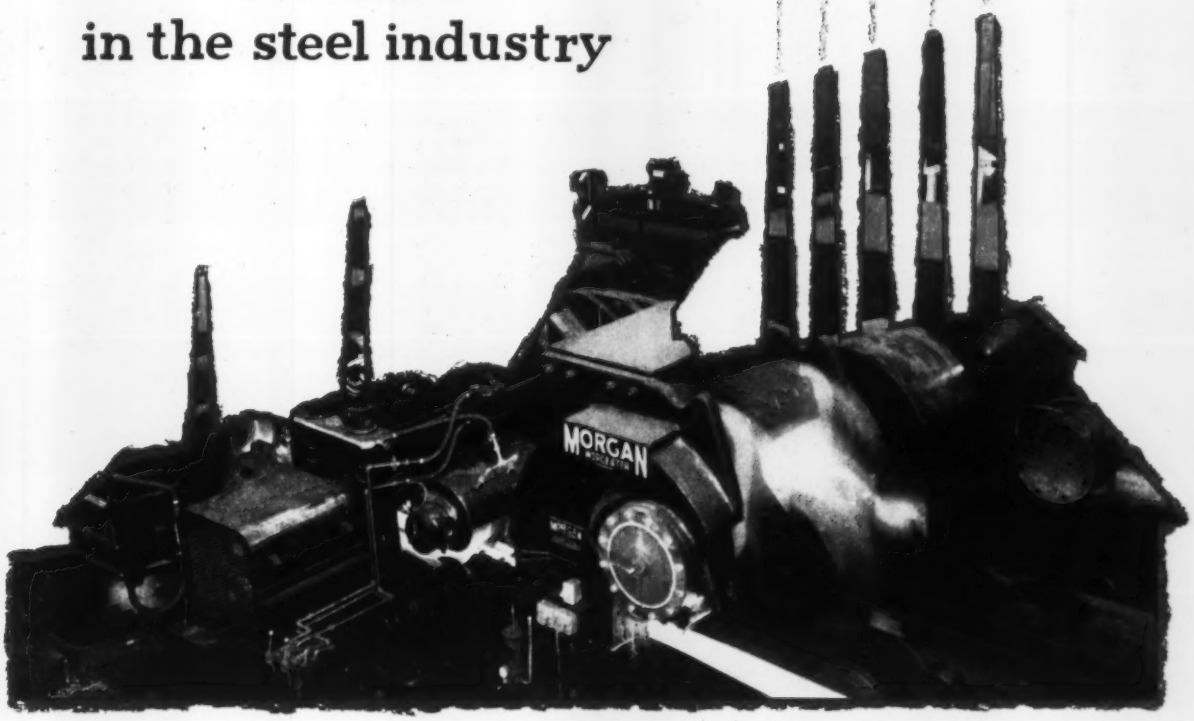
Most damning was this step-by-step recital by Carl Hokanson, a small air conditioning manufacturer: 1. A big prime requested a quote on Mar. 1, 1956, for a special air conditioner for military aircraft. 2. On Mar. 15, the firm returned its quote with a complete design concept and cost breakdown. 3. A purchase order was received May 1. 4. The first unit was delivered Sept. 19. 5. After learning the unit was to be redesigned, Mr. Hokanson requested the opportunity to bid on the new specifications early in 1958. 6. In the summer, the company learned the prime was going to build its own air conditioners. 7. Late in the year it heard the new units were not meeting Air Force performance expectations. 8. In February, 1959, the same prime asked for quotes on five more air conditioners. 9. Mr. Hokanson submitted quotes and an engineering concept again in March. 10. Knowing that 70 units were to be built, he asked if he would get the order for the other 65. The company's reply, in Mr. Hokanson's words: "Only five would be purchased. Two would meet an emergency requirement of the Air Force. Three would be used as samples for the company's own production department in building the balance of their requirement."

Renegotiation Is the Key

Testimony like that forces Congress to hold on to the Renegotiation Act despite strong views of nonaircraft manufacturing firms, represented by the Machinery & Allied Products Institute. Without consideration of the facts of the aircraft industry's case, it is sad but true that all industry is, in a sense, being made to pay for the aircraft companies' high percentage of government furnished property.

MORGAN WORCESTER

. . . . . important words in the steel industry



. . . important because MORGAN stands for creative engineering nurtured by 70 years of acquiring experience in the rolling mill field. MORGAN developed the first continuous rolling mill in the United States—and has consistently maintained pre-eminence in this field. The true test of MORGAN quality and performance is shown in the number of new mills ordered by old customers.

MORGAN WORCESTER

Write for our new booklet which shows, in greater detail, the range of MORGAN mills.

MORGAN CONSTRUCTION COMPANY

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Gabriel Starts Rocket Fuel Plant

Gabriel Sees Auto Market Growth

Gabriel Sells Ward Auto Products Div.

HEADLINES like those in the industrial press show that Gabriel Co., Cleveland, is going through the bittersweet process of changing its corporate personality.

The established maker of shock absorbers for the auto industry has some young ideas about diversifying for the growth opportunities of the scientific sixties.

• Gabriel is no longer tied to the fortunes of one market.

Years of experience in producing direct acting automobile shock absorbers taught the company that: Long run consumer demand makes the production of basic auto components profitable if you stay on top. But the feast and famine cycle of the car captive is too much like living on a roller coaster. As late as 1957, Gabriel derived 90 per cent of its sales from autodom. Its first big steps out of this market brought its sales dependence on cars down to 70 per cent in 1958. This year, going full tilt into rocket technology, the firm hopes to have a 50-50 split in income from auto and nonauto markets.

• Its key move was getting into electronics.

Gabriel's fortunes stood at low ebb in the early 1940s, until President John H. Briggs undertook the company's initial mixing of product lines with the acquisition of a flexible metal hose and coupling facility and another plant to produce automotive, and later television, antennas. The product base was broadened even more in 1951 when the firm bought a producer of piston rings and auto heaters; but the annual report still reflected rain or shine in autodom. The shape of things to come was decided the same year when Gabriel acquired Workshop Associates, Needham Heights, Mass., an engineering and production company, a war-born electronics firm.

As the electronics division of Gabriel, the Needham plant has grown from a marginal producer of high frequency antennas to a major supplier of parabolic microwave antennas for television, FM radio, continental radar defense network, and missile tracking.

• The step from electronics to aircraft-missiles came next.

After buying the Bohanan Mfg. Co., Los Angeles, in January, 1958, Gabriel moved the new division to Compton, Calif., and began building aircraft release devices for bombs, missiles, and fuel tanks. With encouraging backlogs mounting in the aircraft and electronics plants, Gabriel acquired the Talco Engineering Co., Mesa, Ariz., a designer and producer of solid fueled, moderate thrust rockets and ballistic devices.

Gabriel is starting a new subsidiary, Rocket Power Inc., next door to the Talco plant, to produce solid propellents for its rockets.

Gabriel is not as far out of its realm as it appears. It can oversee the space and missile work of its divisions as mainly extended applications of hydraulics and piston type thrusters.

Bohanan produces cartridge operated, quick disconnect systems; Talco makes ballistic pilot ejection devices (as in North American's X-15 rocket plane), and other equipment requiring emergency explosive power. Although both branches are heavily dependent on defense business, commercial applications are in the works. Talco, for example, is a pioneer in explosive forming of metals, a process with great commercial potential.

• "Digestion" and soul searching will decide the future.

"We think we're in a position of growth and profit potential in every part of the business," says Robert T. Hood, vice president and treasurer. "We have achieved the primary purpose of lessening our dependence on the auto industry, but have retained all that's good in the car business." Will there be more acquisitions, more diversification? "We're still digesting these, and are not looking at anyone at present. But we do expect growth in the present product picture."

The new divisions are already adding a healthy glow to Gabriel's prospects. Order backlogs are well above last year's. Sales in the first quarter, normally the lowest of the year, jumped from $4.3 million (in 1958) to $6.7 million; earnings rose from $16,040 to $224,850.

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Exceptionally high strength at critical intermediate temperatures (1400°F to 1850°F) . . . that's the unique advantage you get with Kaiser unburned brick!

When the internal temperature of bricks in a furnace structure reaches the point where the chemical bond is destroyed, brick strength reaches its lowest point and cracking and spalling losses may result. In the chart, note the high crushing strength after firing in the intermediate range. This denotes strong bond at all temperatures — a unique feature of Kaiser unburned bricks.

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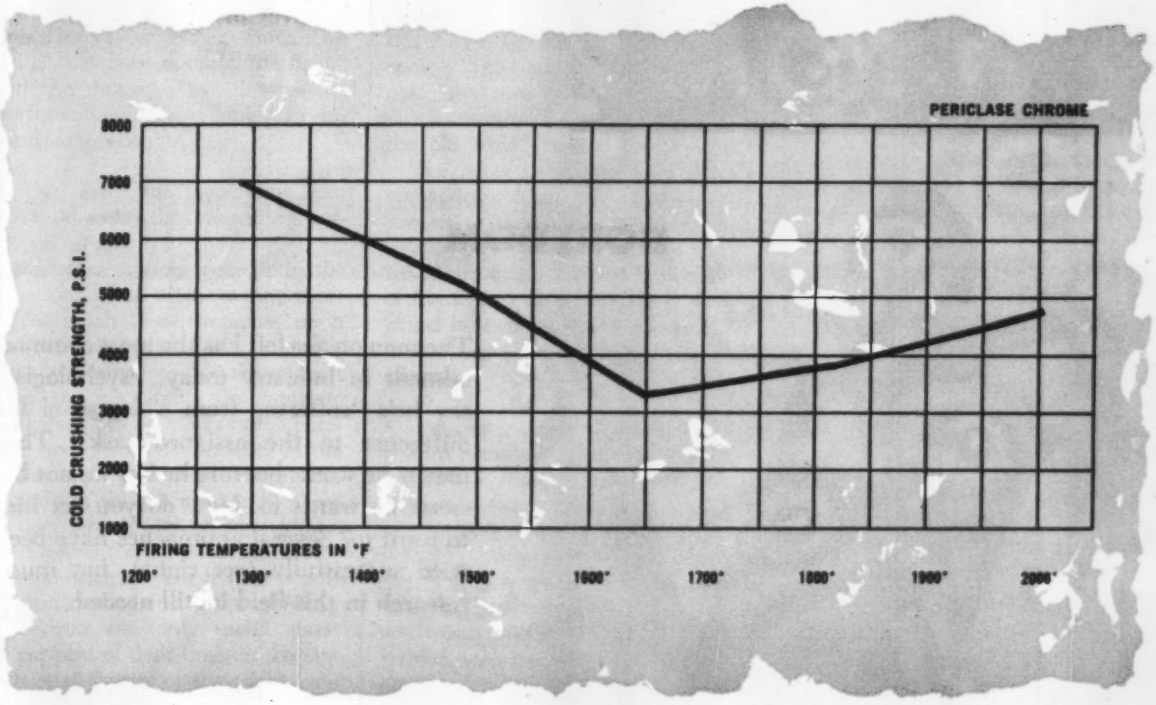

How to

FATIGUE

Few men suffer physical fatigue in industry today. But, psychological fatigue has taken its place. It can—and does—slash productivity just as much, psychologists report. Management hasn't learned how to overcome it. Result: Millions of dollars go down the inefficiency drain. Needed: Concentration by industry on "people research."

POOR VISIBILITY

If your lighting system is five years old, chances are it's obsolete. By upgrading it, you may easily boost worker efficiency 5 per cent or more. And you'll probably curtail accidents, slash reject volume, heighten morale, and improve your plant's appearance. New installations frequently pay for themselves in a year or less.

BOREDOM

The man on the left has the most common ailment in industry today. Psychologists say he's "suffering from a degree of indifference to the assigned task." That means he works because he has to, not because he wants to. How do you get him to want to? Several approaches have been tried successfully (see right), but much research in this field is still needed.

Combat These Productivity Killers

"LESS THAN 1 per cent of the federal government's research and development money goes into research on people. And the government is at least ten years ahead of industry."

That's how Dr. Erwin K. Taylor of Personnel Research & Development Corp., Cleveland management consulting firm, points up the desperate need for industry to take a closer look at the makeup of its employees.

"Companies put millions of dollars into designing better processes but seldom put any money into research on motivating employees to get the most out of those processes," declares Dr. Taylor.

• Fatigue is probably the biggest hole in industry's productivity basin.

Mechanization has virtually rid industry of physical fatigue. But a psychological brand that's even harder to conquer has taken its place.

The odds are that most of your production workers are bored with their jobs. Result: Below par productivity. What can you do?

"There are no sure answers," says Dr. Taylor. "Not enough research has been done in the field." But he suggests five approaches that can take you a long way toward a solution:

• The first line supervisor can often identify the causes of employee fatigue.

He alone is close enough to the situation. But often management places much more emphasis on a foreman's knowledge of the operations performed in his department than on his ability to motivate workers. Says Dr. Taylor: Foremen need sensitivity training in the understanding of people more than they do in the job mechanics phase if they are to be of top caliber. Management often becomes so production-oriented that it forgets production depends on people. Many supervisors can only spend about 10 per cent of their time on the motivational aspects of their jobs, says Dr. Taylor. Raising the percentage can hike productivity.

• Good selection and placement procedures, judiciously used, can prevent boredom.

Companies often hire people who are overqualified for the jobs assigned them. Result: With no challenge, they become bored and quit, or their productivity declines. A telephone company study of switchboard operators disclosed that the girls who learned fastest left soonest. Dr. Taylor says over 75 per cent of employee turnover results from placing overqualified workers on routine jobs. "For a job that makes few demands, you need a person who indulges in a great deal of reverie and fantasy," he reports.

• Another solution: Give employees more short range goals.

A Detroit Edison Co. experiment proves that point. The job: Sorting bills. The old method: Several thousand bills were dumped on a worker's desk at one time. Low productivity and many errors resulted. The new method: Only a few hundred bills are deposited each time. Result: Higher productivity and few mistakes. Reason: "The employee is given a goal he's sure he can reach. He was overwhelmed by the task the old way," reports Dr. Taylor.

The same held true on another operation. The job: Assembling heaters. The old method: The worker put completed heaters on a conveyor which carried them out of his sight. New method: Completed heaters are stacked where the worker sees tangible evidence of his efforts.

• Industry needs professionally trained personnel men.

"One of industry's big problems is that managers are poorly trained in the motivation of people," asserts Dr. Taylor. "The human being is much more complex than most highly automated lines. But, while only highly skilled and fully trained men are permitted to handle the line, totally untrained men often handle the people," he says. That results in poor selection, placement, and motivation, he believes.

"A set percentage of your company's R&D budget should go for 'people research,'" believes Dr. Taylor. It should be done by specialists who are counterparts of your physicists and research engineers, he says.

• Nonmonetary incentives sometimes overcome job dissatisfaction and psychological fatigue.

Music systems, coffee breaks, properly timed rest periods, and other such benefits usually result in higher productivity. "But be careful," warns Dr. Taylor. "Examine the costs and consequences of any such measures before you proceed."

• Music can relieve worker tension.

"Our installation has been effective in the field of employee morale . . . has increased production . . . reduced fatigue among our operators," reports C. L. Saxe, president, Thermo Products Inc., Albany, N. Y.

At Lever Bros. Co., New York, typing errors were reduced 38.6 per cent after a music system was installed. Productivity among IBM key punch operators climbed 18.6 per cent at Mississippi Power & Light Co., Jackson, Miss.

Other benefits attributed to music: 1. Drafting room productivity increased 20 per cent at Fischer Lime & Cement Co., Memphis, Tenn. 2. Clerical absences dropped 5 per cent at National Gypsum Co., Buffalo.

• Adequate lighting is essential to good productivity.

Lighting can be an important production tool. Erickson Tool Co., Cleveland, hiked worker efficiency 10 per cent, cut minor accidents in half, and decreased rejects about 5 per cent in one department, more than 10 per cent in another—all as the result of a new lighting system.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

BULLARD

"H.B.M., Model 75 is better than any other machine we've ever seen."

This statement by Mr. John Gruber, Plant Foreman of George Hantscho and Company, Inc., Mount Vernon, New York, manufacturers of printing equipment, sums up their experience since installing the Bullard 4" H.B.M., Model 75, in June 1957.

He further states "our presses and paperfolding machines are made to order and each job varies from the one before it. Because of this, we can't use assembly line or mass production techniques."

"The only mass production we have is the machining of holes in cast iron, up to as many as 105 in a side frame. Since we've been using our Bullard H.B.M., Model 75, with BULLARD AUTOMATIC POSITIONING we have not spoiled a single piece due to the malfunctioning of the machine."

Do you know the full story on the Bullard H.B.M., Model 75? If not, it will pay you to call your nearest Bullard Sales Engineer — he'll be glad to give you all the details or write

THE BULLARD COMPANY BRIDGEPORT 9, CONN

Why GM Reorganizes Central Foundry

Autodom wonders whether the consolidation of General Motors Corp.'s Central Foundry and Fabricast divisions means the company is deviating from its decentralization philosophy. The answer is no. The biggest reason for the move is to combine Central's casting experience with Fabricast's aluminum knowhow as GM seeks more uses for the light metal. Central's general manager, James H. Smith, right, will head the combined operation.

GENERAL MOTORS CORP. has integrated its Fabricast Div. into Central Foundry Div., Saginaw, Mich. The merger, unusual under GM's decentralization philosophy, places iron and aluminum casting facilities under a single head. It has also given rise to speculation in autodom's metalworking quarters as to why the move was made and whether it will be followed by more unification.

• Why—Referring to the consolidation, John Gordon, GM's president, says: "These two divisions are being consolidated to capitalize to the fullest on their facilities and organization in the fields of cast iron and aluminum." Detroit takes that to mean GM plans to use more aluminum and, to do so, it expects to make use of gray iron experience and facilities. Four bits of information lead to this conclusion.

1. Important to Central Foundry is the fact that, since 1950, the corporation has been operating a molten metal pilot plant at Fabricast's Jones Mills location, under an aluminum contract with Reynolds Metals Co., Richmond, Va. Experience gained there can be put to use by the Saginaw division, as well as give Central Foundry a predictable supply of molten metal for aluminum castings.

2. The company is well along in developing aluminum engines. One will be out this fall in Chevrolet's light car, the Corsair. A water cooled job is expected by 1962. In addition, the adoption of a transaxle by GM will call for a combined transmission-differential housing, probably of aluminum.

3. GM's Detroit Diesel Div. already has announced it can convert its machining and assembly lines to handle gray iron or aluminum. Metalmen suspect the same switch could be made by other divisions.

4. In what may turn out to be one of 1958's most important speeches to foundrymen, Dr. Robert F. Thomson and Darl F. Caris laid out GM's future position when they told the Gray Iron Founders' Society that industry must find ways to improve gray iron castings, to diversify, or include aluminum casting facilities in their foundries. By consolidating Fabricast and Central Foundry, GM is taking a page from its own book.

Putting those tidbits together,

Plants	Typical Operations
Saginaw, Mich.	Malleable iron wheel hubs, differential carriers, spring hangers.
	Pearlitic malleable rocker-arms, crankshafts, transmission parts, diesel pistons.
Danville, Ill.	Gray iron brake cylinders, electric motor frames, pump housings, manifolds, and transmission cases.
	Malleable iron pulleys, brake shoes, door hinges.
Defiance, Ohio	Gray iron blocks and heads, flywheel housings and flywheels, camshafts, bearing caps, and transmission cases.
Bedford, Ind. (Fabricast)	Castings (aluminum die-castings; sand, permanent and semipermanent mold, and shell) for automotive and appliance parts. Over 100 products.
	Heat resistant aluminum alloy investment castings for gas turbine parts.
Jones Mills, Ark. (Fabricast)	Some 15 to 20 aluminum die and permanent mold castings for automotive use. Operates under molten metal contract with Reynolds Metals Co.

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Detroit won't be surprised to see Central Foundry casting aluminum blocks for B-O-P cars. Initially, it may use some of its own aluminum casting facilities. Ultimately, it will probably make use of Fabricast's diecasting knowhow and molten metal supply to turn out 65 lb aluminum castings.

• **Why Not** — Other less credible rumors stemming from the consolidation are that Brown-Lipe-Chapin Div., Syracuse, N. Y., will be added to Central Foundry, and that as GM standardizes more, it will tend to consolidate more of its manufacturing facilities.

Brown-Lipe-Chapin's casting facilities are devoted mainly to zinc diecasting. It also has stamping, plating, and anodizing lines, to make hub caps, wheel discs, bumper guards, grilles, and other decorative parts. There seems to be little reason to bring these facilities into Central Foundry's setup.

As for standardization, it's true that GM has combined three bodies into a single adaptable shell. It's expected to standardize more body components in the future. It's also reported that the corporation would like to use a single transaxle design for all car lines with the possible exception of Chevrolet. And it is likely that the first water cooled aluminum block will be used for several car lines.

• **Still Mixed**—This does not mean, however, that GM will consolidate all engine and transmission manufacturing into one or two plants. It has sizable investments in these divisional facilities. No matter how popular aluminum engines become, there will continue to be a demand for gray iron blocks for trucks and certain car lines. These engines are so different it's difficult to use a single block and almost impossible to standardize heads, valve train components, cams, and crankshafts. Car divisions already are slightly miffed at losing some of their autonomy in body designing. They'd be most unwilling to give up major components like engines.

Chrysler and GM Earnings

First quarter reports show Chrysler Corp. sales are 29 per cent ahead of those in the first three months of 1958. General Motors Corp. says sales are up 18 per cent from a year ago.

Chrysler earned $15.2 million ($1.75 a share) on sales of $691 million this first quarter vs. a $15.1 million loss during the like 1958 period. L. L. Colbert, president, reports the company has sold 218,114 vehicles vs. 185,888 units the year before. Quarterly capital expenditures amounted to $13 million, compared with $12 million spent last year.

GM's quarterly net income is $293 million on sales of $3.2 billion. Comparable figures for 1958 are $185 million earnings on $2.7 billion sales. The company's total vehicle sales from U. S. plants are 914,705 units vs. 780,941 last year. Worldwide sales of cars and trucks are 1.13 million vs. 981,963.

• **Chrysler Plans**—Continuing its overseas development (STEEL, May 4, p. 55), Lynn A. Townsend, Chrysler's group vice president, international operations, announces the company plans to build trucks in Argentina. The program, amounting to a $15 million investment, is a joint effort of Chrysler International S. A. and a distributor, Fevre y Bassett in San Justo.

The distributor has a 500,000 sq ft assembly plant with a 20,000 unit annual capacity. Chrysler plans to stock it with equipment and tooling, so that within four years the company will be able to produce 70 per cent of its truck parts locally.

• **GM Plans**—Fisher Body Div. announces expansion of its Lansing and Pontiac, Mich., plants. The Lansing programs call for a 380,000 sq ft addition to facilities used to assemble bodies for Oldsmobile, Chevrolet, and Pontiac convertibles. Employment is 5300. The job will be finished by September.

In Pontiac, Fisher will add 50,000 sq ft to its 1.35 million sq ft plant and rearrange equipment so all Pontiac body styles can be built in the plant. At present, convertible and station wagon bodies are built elsewhere. A new body shop and dual assembly line are part of the modernization.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,112
March	576,085	357,049
April	578,825†	316,503
4 Mo. Totals	2,179,151	1,555,179
May		349,474
June		337,355
July		321,053
August		180,324
September		130,426
October		261,696
November		514,099
December		593,920
Total		4,243,526

Week Ended	1959	1958
Apr. 4	133,878	64,318
Apr. 11	133,202	84,997
Apr. 18	135,934	73,219
Apr. 25	133,987	58,664
May 2	119,034†	78,434
May 9	125,000*	78,506

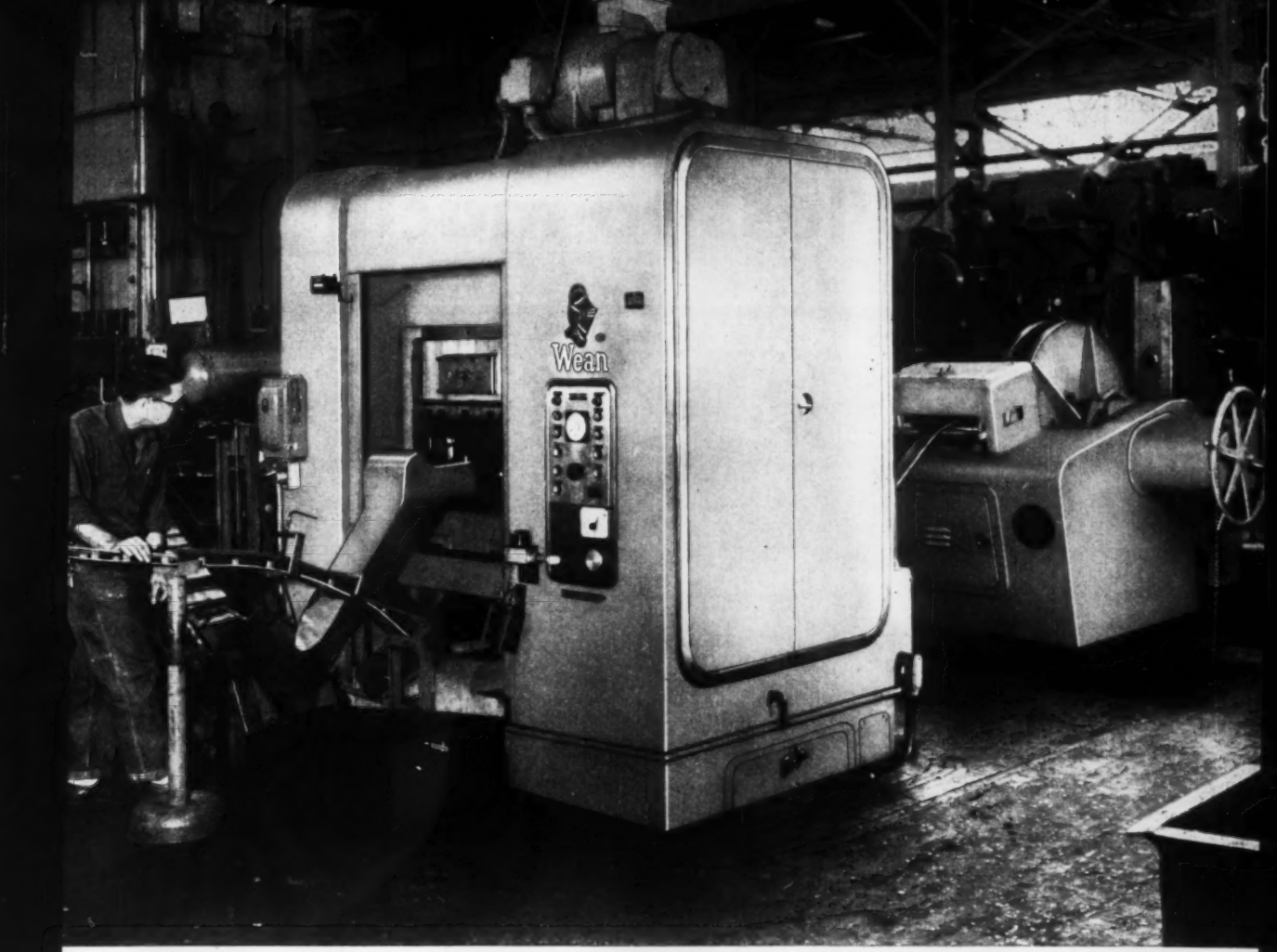
Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

NADA Gives Import Details

Big Three carmakers can breathe a bit easier now. One of the last worrisome theories about small car buying habits has been pretty well squashed by the National Automobile Dealers Association survey on import car buyers. The theory is that many of these import buyers would continue to want foreign cars even when U. S. small cars become available.

Paul E. Herzog, NADA research director, claims it isn't so. His survey indicates that 60 per cent of those persons who own imports wouldn't have bought them if similar domestic cars had been on the market. Not only that, but only 6 per cent of the persons questioned claimed they bought the imports mainly for prestige purposes. Most of those who did were in the less than $3000 income bracket. Mr. Herzog admits that this particular claim may be questionable since few will openly admit buying anything for prestige.

Other survey conclusions: 88 per cent of the import owners bought because the smaller cars are cheaper to operate. Only 47 per cent felt that a lower original price was the prime reason for purchasing, but 62 per cent claim that lower annual depreciation was an important factor influencing their decision to buy.



At major automotive plant:

One Wean "Flying Press" replaces two conventional presses

This manufacturer used to produce transmission vanes on two conventional presses. Using seven-stage dies, these machines delivered the formed vanes at a combined rate of 308 parts per minute.

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Many modern manufacturers have realized similar cost savings through use of the Wean "Flying Press" concept when quantity production, versatility and a high degree of press utilization are required. Won't you write for more information, or for a personal visit from a Wean sales representative? We are certain that he can help you find important potential savings in your production processes, too.

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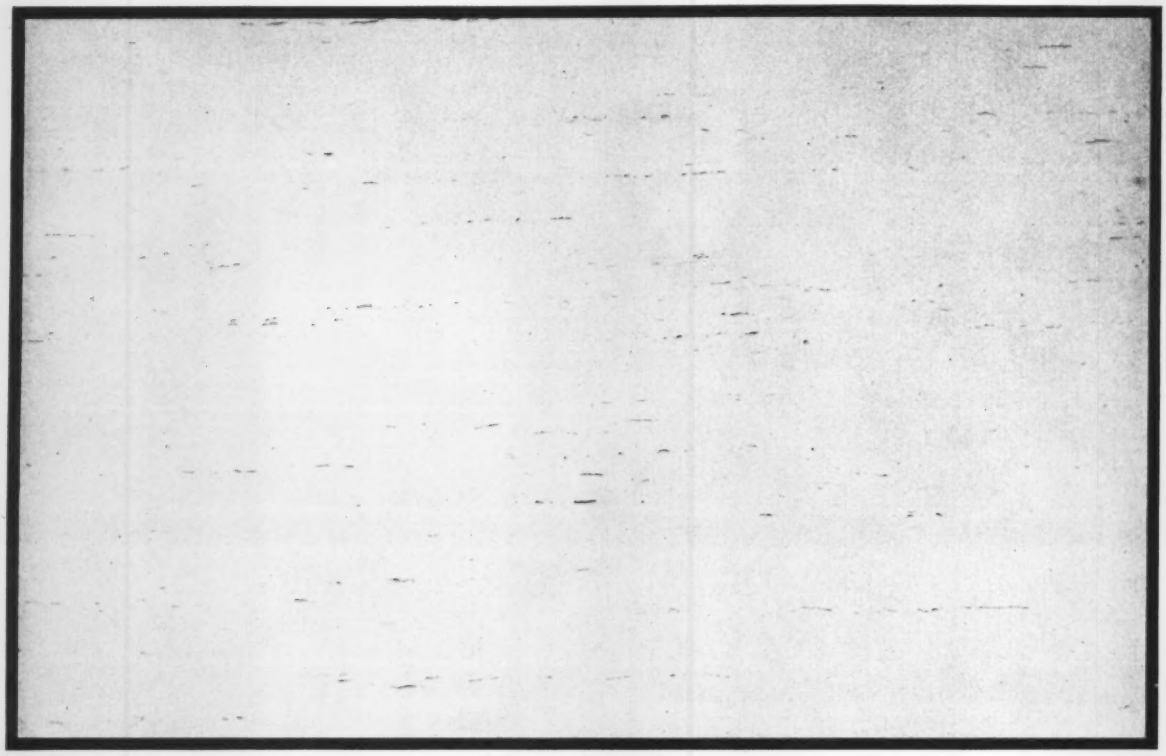

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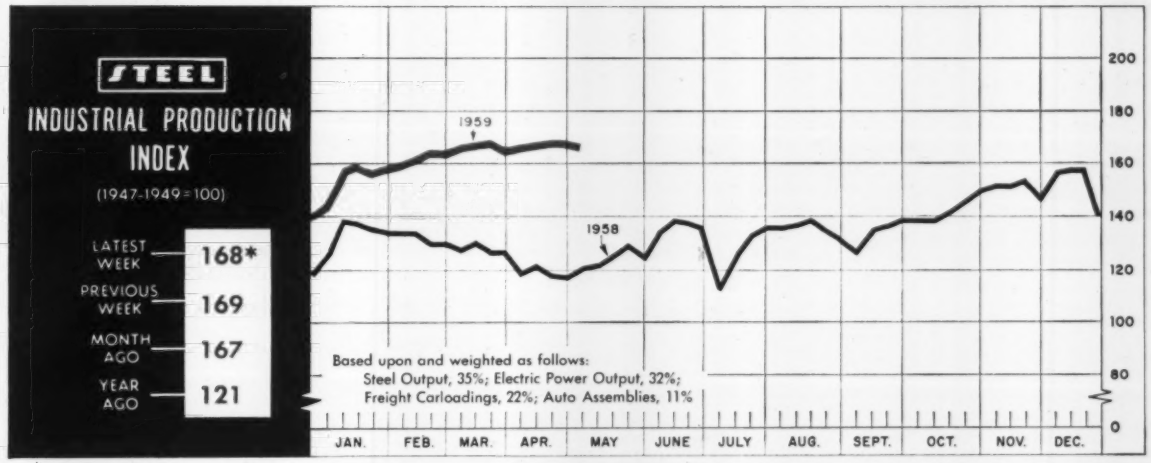

*Week ended May 20.

Construction Is Ahead of Schedule

CONSTRUCTION analysts are erasing their estimates for 1959 and sharpening their pencils to make new ones as this record breaking industry continues to set the pace for the general economy.

Both contract awards and work put in place are getting off to a faster start than experts had anticipated. In the first four months of this year, construction put in place ran 13 per cent ahead of the corresponding period of 1958, latest government figures show. Contract awards, many of which are not reflected in construction activity until several months later, are doing even better. They were 18 per cent higher in the first quarter than they were in last year's first period, says F. W. Dodge Corp.

• **Slowing Down?** — Government figures hint that work put in place is beginning to slow down. Seasonally adjusted, the annual rate of total construction activity in the first four months is: January, $54.468 billion; February, $54.444 billion; March, $54.528 billion; and April, $53.940 billion. Those figures compare with the 1958 estimated total of $48.115 billion and the government's forecast of $52.3 billion for this year. Even if some softness does develop later this year, it appears now that the forecast is going to be short.

Despite the slight downturn, the April total of $4.2 billion for work put in place was a record for that month. Both public and private construction showed significant upturns from March's figures, with residential building leading the way. Industrial building continued weak, but this is a reflection of the recession. (The leadtime between the award of a contract and work in this category is considerably longer than it is in lighter construction.)

• **Bases for Strength**—There are several reasons for believing that the forecasts will be exceeded.

First, a lot of momentum was

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,668[1]	2,627	1,334
Electric Power Distributed (million kw-hr)	12,600[1]	12,538	11,251
Bituminous Coal Output (1,000 tons)	8,025[1]	8,055	6,808
Crude Oil Production (daily avg—1,000 bbl)	7,130[1]	7,132	6,227
Construction Volume (*ENR*—millions)	$410.9	$314.3	$485.6
Auto, Truck Output, U. S., Canada (*Ward's*)	155,210[1]	171,280	105,776
TRADE			
Freight Carloadings (1,000 Cars)	650[1]	647	533
Business Failures (Dun & Bradstreet)	300	304	329
Currency in Circulation (millions)[3]	$31,244	$31,332	$30,518
Dept. Store Sales (changes from year ago)[3]	+4%	+6%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,700	$25,724	$24,019
Federal Gross Debt (billions)	$285.6	$285.6	$275.1
Bond Volume, NYSE (millions)	$29.6	$30.2	$26.4
Stocks Sales, NYSE (thousands of shares)	17,776	17,788	12,434
Loans and Investments (billions)[4]	$94.9	$95.5	$92.1
U. S. Govt. Obligations Held (billions)[4]	$29.6	$30.1	$30.1
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	220.7	220.6	196.9
All Commodities[7]	119.8	119.9	119.3
Commodities Other than Farm & Foods[7]	128.0	128.1	125.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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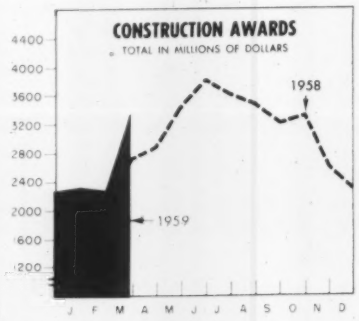
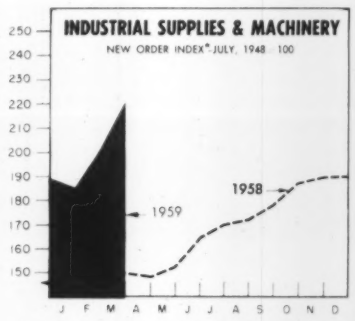




	Total 1959	Total 1958	Building 1959	Building 1958
Jan.	2,319.2	2.060.0	1,839.7	1,530.2
Feb.	2,307.0	1.953.4	1,777.4	1,478.1
Mar.	3,339.9	2,721.2	2,453.9	2,037.7
Apr.	.....	2,881.0	.....	2,198.0
May	.....	3,402.6	.....	2,470.3
June	.....	3,819.6	.....	2,340.3
July	.....	3,607.1	.....	2,633.5
Aug.	.....	3,466.6	.....	2,529.5
Sept.	.....	3,215.9	.....	2,352.5
Oct.	.....	3,309.0	.....	2,549.8
Nov.	.....	2,593.9	.....	1,980.8
Dec.	.....	2,281.9	.....	1,728.6
Totals	.....	35,312.2	.....	25,829.3

F. W. Dodge Corp.
Charts copyright, 1959, STEEL.

(Seasonally adjusted)

	1959	1958	1957	1956
Jan.	186	163	221	190
Feb.	202	157	219	190
Mar.	221	149	210	190
Apr.	...	148	203	195
May	...	152	199	199
June	...	164	199	197
July	...	170	197	203
Aug.	...	172	197	211
Sept.	...	178	203	203
Oct.	...	187	192	206
Nov.	...	189	180	220
Dec.	...	190	167	218

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

picked up in building during the first four months of the year. The difference between cumulative totals for 1959 vs. 1958 is too great to be accounted for by the recession. (Construction dipped in early 1958 but not nearly as much as the general economy did.)

Second, contract awards are maintaining the high level established late in 1958, assuring the industry of a sufficient backlog to keep it busy for several months even if contracts begin to dip later this year. (See graph above.)

Third, housing starts have shown only the slightest signs of declining. During the first quarter, the annual rate was well above 1.3 million. F. W. Dodge revised its original estimate of this year's market from 1.2 million to 1.3 million starts.

Fourth, industrial construction is finally beginning to accelerate from its recession low. One of the impressive features of the weekly contract reports from *Engineering News-Record* has been the steady improvement in this segment. Total value for the first four months is 27 per cent ahead of the corresponding figure for 1958. The backlog of fabricated structural steel orders has been increasing since the first of the year.

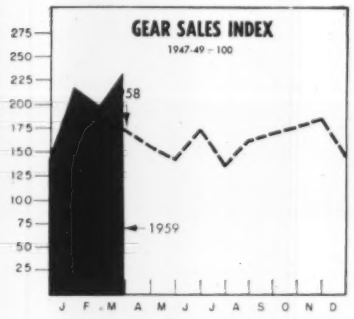
H. C. Turner Jr., president of Turner Construction Co., New York, points out that this upturn may not have much influence on work put in place in 1959, but it should put some backbone into 1960 work. "Another thing to keep in mind is that much of your capital expenditures this year are going into modernization, not new construction. However, industrial building plans may pick up before the year is over—maybe in the last quarter."

• **Costs Going Up**—While building costs have held fairly stable for the last few months, there is much doubt that they can resist the upward movement for long. F. W. Dodge figures building costs have gone up only 1 per cent in the last six months, but they will edge up another 4 per cent in the next year.

"The 1941 building dollar is now worth 39 cents," says a Dodge official. "That means the buyer must put up $2.56 to do the work $1 did before. Twelve months from now the buyer will have to increase the amount to $2.66."

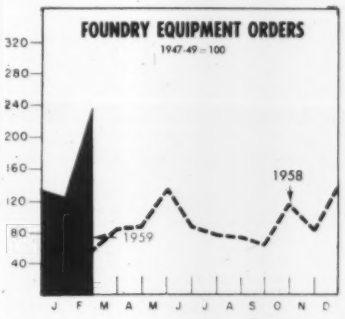
Stocks Build Up Slowly

Inventory buildup has been less than some economists expected. Since the low point was reached



	1959	1958	1957	1956
Jan.	218.6	174.5	259.3	245.5
Feb.	199.9	179.1	239.5	256.2
Mar.	234.3	173.7	262.4	276.5
Apr.	....	153.2	221.7	264.7
May	....	142.2	263.2	275.6
June	....	173.8	215.9	245.4
July	....	133.3	211.4	286.7
Aug.	....	162.1	225.8	219.5
Sept.	....	170.7	174.9	230.5
Oct.	....	175.9	207.0	299.8
Nov.	....	182.7	165.3	216.2
Dec.	....	145.5	150.8	235.7
Avg	....	163.9	216.4	254.4

American Gear Mfrs. Assn.



	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	....	85.9	127.0
Apr.	....	88.7	101.1
May	....	136.1	136.2
June	....	87.7	187.5
July	....	77.9	98.6
Aug.	....	74.1	231.3
Sept.	....	64.5	113.9
Oct.	....	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn.

last December, manufacturers have added only $1.1 billion to stocks (seasonally adjusted) through March, show the latest Commerce Department figures. Most of the addition (about $900 million) has been in durable goods industries.

Reason: During the same period, manufacturers increased shipments by about $1 billion and upped their rate of new orders by $1.6 billion. So they are using up materials nearly as fast as they can get them.

The big change in inventories is expected to come during the second quarter as steel, copper, aluminum, and other nonferrous metals users lay in stocks for an uncertain third quarter. But with new orders coming in at such a rapid rate, it is doubtful that the stock buildup will be much out of proportion to requirements.

Index Levels Near Record

STEEL's industrial producton index is maintaining its high level, but it isn't making any headway recordwise. At a preliminary 168 1947-49 = 100) for the week ended May 2, it is 1 point under the record. During the last nine weeks, the index has fluctuated within a range of only 3 points.

Steel production has about hit its ceiling for the first half. At 94.5 cent of capacity, output was scheduled at close to 2,676,000 net tons for ingots and castings in the week ended May 10.

Auto output was cut back sharply during the last week in April as General Motors Corp. closed some facilities for spring inventory. This will be the pattern for the next few weeks, although over-all production will remain well over the 500,000-unit-a-month rate. (*Ward's Automotive Reports* says the current rate of production projects to about 6 million units for 1959.)

Output of electricity is at the turning point between the late winter dip and the spring upturn. The improvement will be small for a while, but at about 12.6 billion kw-hr a week, the industry is surpassing the corresponding 1958 figures by about 11 or 12 per cent.

The big plus in the immediate future will be in freight carloadings. Strength will come from three sources: Iron ore loadings, coal shipments, and miscellaneous freight. If the other three elements in the index do no worse than hold at present levels, carloadings may move the index up a notch or two by July 1.

W. C. "BILL" PINE, Hayes Chief Metallurgist, reports . . .

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F. W. LAVERTY
Clark Bros. president

JOSEPH E. ADAMS
White Motor executive post

CECIL HEILMAN
Diebold mfg. v.p.

J. M. OLESEN
Lyon Metals exec. v.p.

F. W. Laverty was appointed president of **Clark Bros. Co.**, Olean, N. Y. He was executive vice president. He succeeds **J. N. MacKendrick**, now chairman, replacing **C. Paul Clark**, who was made honorary chairman.

William Hallam was made sales manager, **National Electric Div.**, Pittsburgh, H. K. Porter Company Inc. He was St. Paul district sales manager.

R. W. Burgeson was elected president, **Hoefer Mfg. Co.**, Freeport, Ill., succeeding **G. F. Oliver**, now chairman.

William E. Hunter was made general sales manager, Gonset Div., **Young Spring & Wire Corp.**, Burbank, Calif.

B. R. McBath was made general manager of **Worthington Corp.'s** Plainfield, N. J., Div., responsible for engineering, manufacturing, and sales. He succeeds **K. W. Horsman**, resigned. **Joseph Goldsten** was made manager of engineering for the division to succeed **W. L. Gaya**, assigned to the headquarters engineering staff at Harrison, N. J. **Charles D. Wood** was made district office manager at Boston for Worthington to succeed **Richard M. Cleveland**, retired.

Robert W. Ross was made Great Lakes regional sales manager for **Standard Conveyor Co.**, St. Paul.

Joseph A. Rzezutko was made production manager, Detroit plant, **American Metal Products Co.**

Joseph E. Adams was appointed to the new post of executive vice president-manufacturing and development at **White Motor Co.**, Cleveland. He was vice president-manufacturing.

Cecil Heilman was elected vice president - manufacturing, **Diebold Inc.**, Canton, Ohio. He was works manager of the Canton plants. He now directs manufacturing at Diebold's Canton and Malvern, Ohio, plants; at Record Files Inc., and K. F. Cline, Dickson, Tenn., both subsidiaries; and at Diebold of Canada Ltd., Toronto, Ont.

Donald F. Brookland was elected vice president for alloys, **Tennessee Products & Chemical Corp.**, Nashville, Tenn., subsidiary of Merritt-Chapman & Scott Corp. He succeeds **Marcus Evans**, transferred to an administrative post at Nashville. Mr. Brookland was vice president-operations, Keokuk Electro Metals.

A. T. Richter was promoted from Pittsburgh district sales manager to assistant general sales manager, **Midvale-Heppenstall Co.**, Philadelphia.

G. E. Steiner was appointed president, **M. C. Jones Electronics Co. Inc.**, Bristol, Conn., recently purchased by Bendix Aviation Corp. He was general manager of Bendix's Scintilla Div. **Stanley T. Urbank**, one of the founders of the Jones company and formerly chief executive officer, was named vice president-general manager. **M. C. Jones**, former president of the Jones firm, will act as a consultant.

J. M. Olesen was elected executive vice president, **Lyon Metal Products Inc.**, Aurora, Ill. He was vice president-sales.

Bridgeport Brass Co., Bridgeport, Conn., elected as vice presidents **Joseph P. McNamara** and **Frank J. Cunnane**. Mr. McNamara, formerly assistant secretary and counsel, is now vice president-personnel. Mr. Cunnane, manager of the Housatonic plant in Bridgeport, continues to head this facility as vice president and plant manager.

Sidney Metzger joined the manufacturing staff of **Brush Beryllium Co.** at Elmore, Ohio, as rolling mill superintendent, Alloy Div. For the last nine years, he has been process engineer with W. B. Driver Co., Newark, N. J.

Ernest E. Swartswelter was elected vice chairman of **Blaw-Knox Co.**, Pittsburgh. He was chairman of Aetna-Standard Engineering Co., recently acquired by Blaw-Knox.

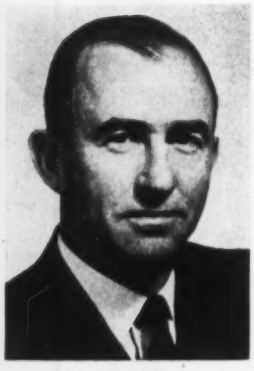
Lawrence B. Raskin was promoted from vice president to president of **Toledo Pickling & Steel Service Inc.**, Toledo, Ohio. **Harold Osburn** was named vice president.

Chain Belt Co. appointed **Roland V. Poisson** Chicago district sales manager. Former sales manager for the company's Roller Chain Div. at Springfield, Mass., he is succeeded by **Joseph W. Cox. William E. Kennedy** succeeds Mr. Cox as sprocket sales manager, Worcester, Mass., plant. Mr. Poisson succeeds **G. A. Gunther**, who assumes the

EDWARD McL. TITTMANN

ROBERT D. BRADFORD

Asarco executive vice presidents



FRANK PACE JR.

EARL D. JOHNSON

General Dynamics chairman and president

new post of special account executive in the Chicago area.

Edward McL. Tittmann and **Robert D. Bradford** were elected executive vice presidents, **American Smelting & Refining Co.**, New York. **Charles F. Barber** and **Forrest G. Hamrick** were elected vice presidents. Mr. Bradford is president of Lake Asbestos of Quebec Ltd., subsidiary, and is in charge of the company's Federated Metals Div. Mr. Tittmann is chairman of Southern Peru Copper Corp., owned by Asarco.

J. Douglas Darby was appointed vice president and assistant to the president, **United States Steel Corp.**, Pittsburgh. He was an administrative vice president-commercial.

Ralph A. Castillo was appointed general manager of **Joseph T. Ryerson & Son Inc.** at Houston. He has been serving as Houston branch manager, a position he occupied with Vinson Steel & Aluminum Co., from which Ryerson acquired the plant last December.

Earl D. Johnson was elected president, **General Dynamics Corp.**, New York. Former executive vice president, he succeeds **Frank Pace Jr.**, who was elected chairman, and remains chief executive officer. **Carleton Shugg**, general manager, **Electric Boat Div.**, Groton, Conn., and a senior vice president of the corporation, was promoted to president of the division. **Dr. Frederic de Hoffmann**, general manager, **General Atomic Div.**, San Diego, Calif., and a corporation vice president, was promoted to president of the division and a senior vice president of the corporation. **C. Rhoades MacBride**, General Dynamics' vice president - operations, was made senior vice president-operations.

Gerard F. Hart succeeds **Thorning Wood**, retired, as secretary of **Gifford-Wood Co.**, Hudson, N. Y.

Gardner D. Carpenter joined **McLaughlin Co.**, Birmingham, Mich., as chief engineer. He was with Mt. Clemens Metal Products Co., and has been in fastening engineering for over 20 years. Previous assignments were with Ford Motor Co., Fisher Body Div. of General Motors Corp., and Chrysler Corp.

Tedford M. Hendrickson was named power engineer for **Youngstown Sheet & Tube Co.**, Youngstown, succeeding **Paul R. Duffey**, retired. **Robert F. Doolittle** was elected general counsel and secretary to succeed **Judge James E. Bennett**, retired. **William J. Harnisch** was elected assistant secretary.

Fred D. Brown was made marketing manager for **Westinghouse Electric Corp.'s** Arc Welding Dept. He is at the department's main plant in Buffalo. He was manager of the corporation's Nuclear Ship Section, a special group responsible for liaison between all Westinghouse divisions and the staff of Adm. H. G. Rickover.

Lee D. Nutter was named vice president-marketing, **Holly-General Co.**, division of Siegler Corp., Anaheim, Calif. He had been with General

J. DOUGLAS DARBY

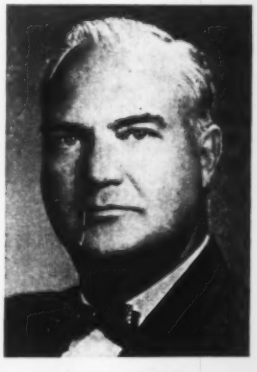
U. S. Steel post

RALPH A. CASTILLO

Ryerson gen. mgr.

GARDNER D. CARPENTER

joins McLaughlin Co.



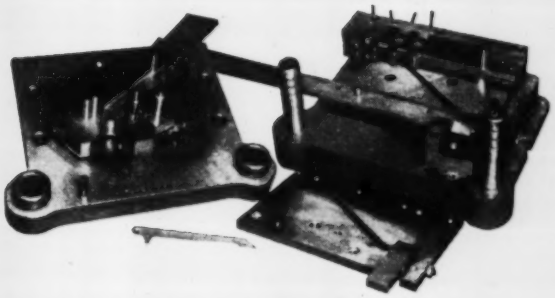
LEE D. NUTTER

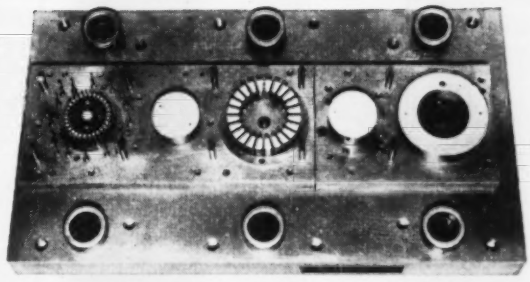
Holly-General v.p.

the names that stand for **production**

in the metal-working centers of America

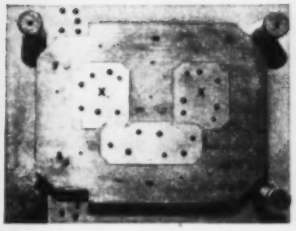
air hard

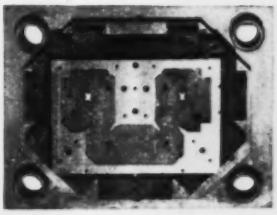




ohio die

crocar





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HARPER D. ROTH
Harper Electric Furnace v.p.

RICHARD G. WALSH
Titeflex eng.-director

HERBERT A. BOAS JR.
Budd Co. v. p.

AUGUST SUNNEN
Sunnen Products Ltd. pres.

WILLIAM H. SMITH
Ford-Indianapolis post

GEORGE USTIN
Buchanan v.p.-eng.

Electric Co. for 22 years in a variety of executive sales positions.

August Sunnen succeeds his father, the late **Gus Sunnen**, as general manager of **Sunnen Products Ltd.**, Chatham, Ont. He was vice president of Ramsden Mfg. Ltd., a permanent mold aluminum foundry in London, Ont. He had previous association with Sunnen Products Co., St. Louis, parent firm.

William H. Smith was made plant manager for **Ford Motor Co.'s** Indianapolis steering gear and cold heading plant, Transmission & Chassis Div. He succeeds **R. T. Thornton,** now general manufacturing manager, Hardware & Accessories Div., Rawsonville, Mich. Mr. Smith was manufacturing manager at the Indianapoils plant.

Bernard A. Monaghan was elected president, **Vulcan Materials Co.**, Birmingham. Former executive vice president, he succeeds **Charles W. Ireland,** who was made chairman, a post formerly held by **A. C. Buttfield.**

George Ustin was named to the new post of vice president - engineering, **Buchanan Electrical Products Corp.,** Hillside, N. J., subsidiary of Elastic Stop Nut Corp. of America. He joined Buchanan five years ago. Previously he was general manager of the cord set plant of the Hatfield Wire & Cable Div., Continental Copper & Steel Industries.

Mel S. Nielsen was appointed western division manager, a new post, for **Truarc Retaining Rings Div.,** Waldes Kohinoor Inc., with headquarters in Los Angeles. In addition to over-all responsibility for the western territory, he will serve as Truarc sales engineer in southern California, Arizona, New Mexico, and parts of Nevada, succeeding **Ludwig L. Bluth,** retired. **Paul W. Vapnek** succeeds Mr. Nielsen as sales engineer in northern California, Washington, and Oregon, with headquarters in San Francisco.

Donald H. Parrish was made San Diego, Calif., works manager, **Stromberg - Carlson Div.,** General Dynamics Corp.

Harper D. Roth was elected vice president-marketing, **Harper Electric Furnace Corp.,** Buffalo. He was treasurer and is succeeded by **Warren J. Eberhardt,** former assistant treasurer.

Richard G. Walsh was appointed director of engineering, **Titeflex Inc.,** Springfield, Mass. He was manager of Engineering Test and Design Engineering Depts., Aircraft Engine Div., Ford Motor Co., in Chicago. Titeflex is a subsidiary of Atlas Corp.

Herbert A. Boas Jr. was elected a vice president of **Budd Co.,** Philadelphia. He joined the company in March of last year as director of marketing and was also named a member of the policy committee. He continues to serve in both capacities. Prior to joining Budd, he was with Sinclair Refining Co. and with Sinclair Oil Corp.

Myron P. Roebuck was named vice president-special products engineering, **Canoga Div.,** Underwood Corp., Van Nuys, Calif.

William S. Ivans Jr. was appointed vice president, **Cohu Electronics Inc.,** San Diego, Calif.

John F. Doran was promoted to chief industrial engineer at **Chase Metal Works,** Waterbury, Conn., Chase Brass & Copper Co. Inc. He replaces **John H. Burns,** now on the staff of the vice president-sales.

Frank A. Guba fills the new post of manager of marketing for **Damascus Tube Co.,** Greenville, Pa. He has served the company as a consultant on marketing for several months. He previously was manager-market research and development of Carpenter Steel Co.'s Alloy Tube Div.

OBITUARIES...

R. J. Skinner, 52, sales manager, **Rockford Machine Tool Co.,** Rockford, Ill., died Apr. 26.

Ronald W. Thompson, 60, sales engineer for **Transue & Williams Steel Forging Corp.,** died recently in Miami Beach, Fla.

John Hendrickson, 61, chairman, **Welding Engineers Inc.,** Philadelphia, died May 1.

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J&L's $50 Million Project At Cleveland to Cut Costs

JONES & LAUGHLIN Steel Corp., Pittsburgh, has launched a $50 million program to improve its Cleveland Works, including construction of two basic oxygen furnaces and a large blast furnace. It follows closely completion of a $90 million program which doubled capacity for cold rolled sheets and plates and increased ingot capacity by about 80 per cent.

J&L's capital expenditures at all its plants during the next three years are expected to reach $234 million, including $165 million already budgeted. The funds will be spent for ore beneficiation, sintering plants, coke ovens, a new blast furnace, open hearth improvement, precipitators for smoke control, a new electrolytic line, and a continuous annealing line for the production of tin plate.

• **Will Cut Costs**—One of the primary objectives of the current program is cost reduction, especially in production of ingots. Says Avery C. Adams, chairman and president: "The basic oxygen process represents the only major technological breakthrough at the ingot level in the steel industry since before the turn of the century . . . The best open hearth practice results in a production rate of 39 to 40 tons per hour. Our basic oxygen furnaces (at Aliquippa, Pa.) produced at the rate of 106 tons per hour in April. On a 'trick heat' basis, we have hit 160 tons per hour."

• **Basic Oxygen Furnaces** — The two new furnaces at Cleveland are expected to produce 160 ton heats. They will have a combined annual rated capacity of 1.2 million tons and will be constructed adjacent to eight 175 ton stationary open hearth furnaces which are to be deactivated and partially dismantled.

Three 220 ton stationary open hearth furnaces with a rated capacity of 720,000 tons of steel a year will remain in operation. They have been equipped with oxygen lances and basic roofs to increase quality and to speed production. Two new large electric arc furnaces with a rated annual capacity of 420,000 tons also will be operated. That will bring the annual capacity of the Cleveland Works to about 2,340,000 tons compared with 1,945,000 tons at present.

• **Big Blast Furnace**—The new ironmaking facility to be constructed in the immediate vicinity of two other blast furnaces at the works will have one of the largest hearth diameters and one of the largest working volumes in the U. S. The 110 ft high stack will have a diameter of 32 ft and a working volume of 65,000 cu ft. It will have a daily rated capacity of 2500 tons and will increase the yearly rated ironmaking capacity at the Cleveland Works from 866,000 to 1.8 million tons.

• **Air Pollution Control** — J. R. Powell, manager, Cleveland Works, says all steelmaking facilities will incorporate the latest developments for air pollution abatement. Upon completion of the current program, about $10 million will have been expended since 1957 to minimize pollution. Included are electrostatic precipitators for the basic oxygen furnaces, the three open hearth furnaces to remain in operation, and the two electric furnaces; an orifice scrubber for the new blast furnace, and the recently installed blast furnace slag pit.

Kaiser Boosts Production

Kaiser Aluminum & Chemical Corp., Oakland, Calif., opened a new production line at its Ravenswood, W. Va., plant. An aluminum ingot casting station also will go into operation, increasing the plant's annual production to 108,750 tons of primary aluminum.

Kaiser Aluminum & Chemical Sales Inc. has established a new source of aluminum tube. The company has contracted with General Tube Co., Torrance, Calif., a subsidiary of General Aluminum Corp., for the manufacture of welded aluminum furniture tube which Kaiser will sell in the West.

Jerry Schmidt, president of General Aluminum, says a high speed Yoder tube mill and New Rochelle high frequency welding unit have been installed to manufacture the new line. The tube will be made from Kaiser aluminum coiled sheet or from reroll stock rolled and slit at General Tube.

Stamping Div. to Expand

Eaton Mfg. Co. is expanding its Stamping Div. at Cleveland. Capital expenditures: About $500,000. Under the program, manufacturing area of the plant will be increased about 22,000 sq ft, or 10 per cent. New equipment is being installed to expand the anodized aluminum and nickel-chrome plating facilities.

Revere Expands Foil Plant

Revere Copper & Brass Inc., New York, plans to increase its aluminum foil production capacity by expansion of its plant in Newport, Ark. The addition to the building and installation of new equipment will increase plant capacity by nearly 50 per cent, says J. M. Kennedy, chairman.

Haynes Installs Press

Haynes Stellite Co. has constructed a plant and installed a new forging press and other equipment at Kokomo, Ind., to process superalloys. Ingots will range from 1500 lb to 5 tons. All steps in alloymaking (from melting raw materials to producing finished sheets, plates, bars, wire, and remelt shot) are handled at the same plant. Haynes is a division of Union Carbide Corp., New York.

Expands Extrusion Plant

The U. S. Air Force has appropriated $2 million to finance the major part of an expansion program at Curtiss-Wright Corp.'s extrusion plant at Northland Avenue and Grider Street, Buffalo, N. Y. The company's share of the cost

(*Please turn to Page* 134)

1ST The outstanding Type RCP Constant Potential Power Source for gas-shielded fully automatic and semi-automatic welding. Available in 500-, 600- and 1000-amp ratings to suit every need. May be used with separate Dynamic Reactor.

2ND A complete 200-amp, Type RCC Constant Current Welding Power Source "package" for use with the popular WESTINGARC* SA-110 and SA-111 semi-automatic hand guns and control monitor. Converts to manual welding use at the flick of a switch.

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The RCV Power Source, with its built-in contactor and controls and built-in Dynamic Reactor, opens new fields for welding of light-gauge steels—mild and stainless—aluminum and magnesium. It permits all-position welding . . . reduced welding wire costs . . . improved "wash" and penetration over a broad range of applications and material thicknesses.

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Features:

• Primary circuit breaker with full over-current protection • Thermoguards® in each transformer winding for thermal protection • Single phase—230 volts. May be used where higher primary voltage is not available; reconnectable for 460 volts • Auxiliary transformer for 110 volts to supply control monitor • Built-in contactor—operated by trigger of SA-120 and 121 gun
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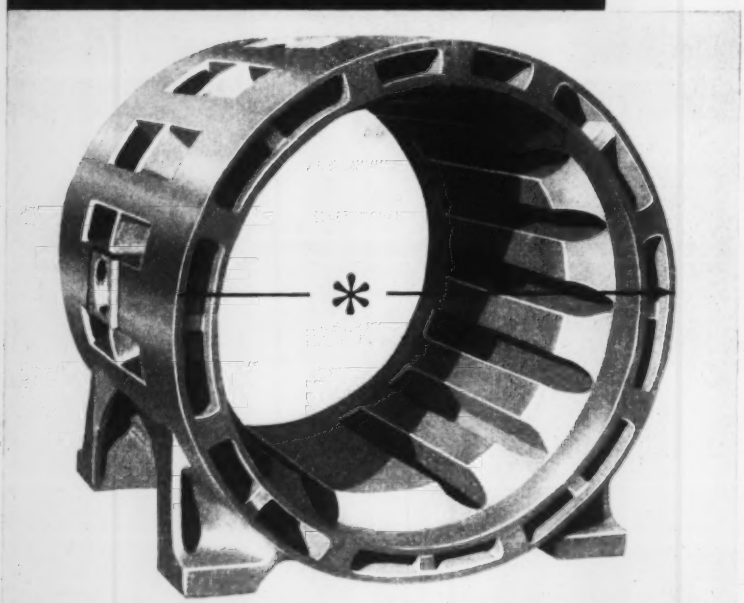
Watch Westinghouse for New Developments in Welding

URICK'S DUCTILE IRON



Courtesy RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, O.

MOTORS . . . . from the Lakes to the Sea

This 1300-pound URICK casting (a fan cooled motor stator frame made to Navy specifications) will withstand extra stress and strain and has better corrosion resistance because it is Ductile Iron. URICK recommends and successfully casts Ductile whenever greater tensile strength and higher impact value are of prime consideration because it has most of the advantages of steel, yet because of its high molten fluidity, it will take intricate shapes not possible with other high strength metals. Other advantages are—Ductile castability permits weight reduction while maintaining required physical properties . . . superior machinability reduces machining time and consequently results in longer tool life. There are other advantages and economies to Ductile when recommended, engineered, and cast by URICK, ask about them.

**This fan cooled motor stator frame to US NAVY specifications is cast in 16 different sizes from 16" to 42".*

Send for Bulletin on URICK's Ductile . . . ask for catalog on URITE gray iron and URICK's facilities, too! Remember, URICK starts with 'U.'

URITE CASTINGS

URICK FOUNDRY

ERIE, PENNSYLVANIA

LICENSED UNDER PATENTS OF THE INTERNATIONAL NICKEL COMPANY, INC.

(*Concluded from Page* 131)

may run as high as $1 million. The plant is basically an Air Force installation operated by Curtiss.

Pittsburgh Screw Renamed

Pittsburgh Screw & Bolt Corp., Pittsburgh, changed its name to Screw & Bolt Corp. of America.

CONSOLIDATIONS

Rockford Machine Tool Co., Rockford, Ill., acquired **Maplewood Machinery Co.**, Chicago, producer of roll forming equipment, and **Ingels Elbow Machine Corp.**, Chicago, maker of power and hand tools for sheet metalwork. All manufacturing activities will be moved to Rockford and operated as the Maplewood Div.

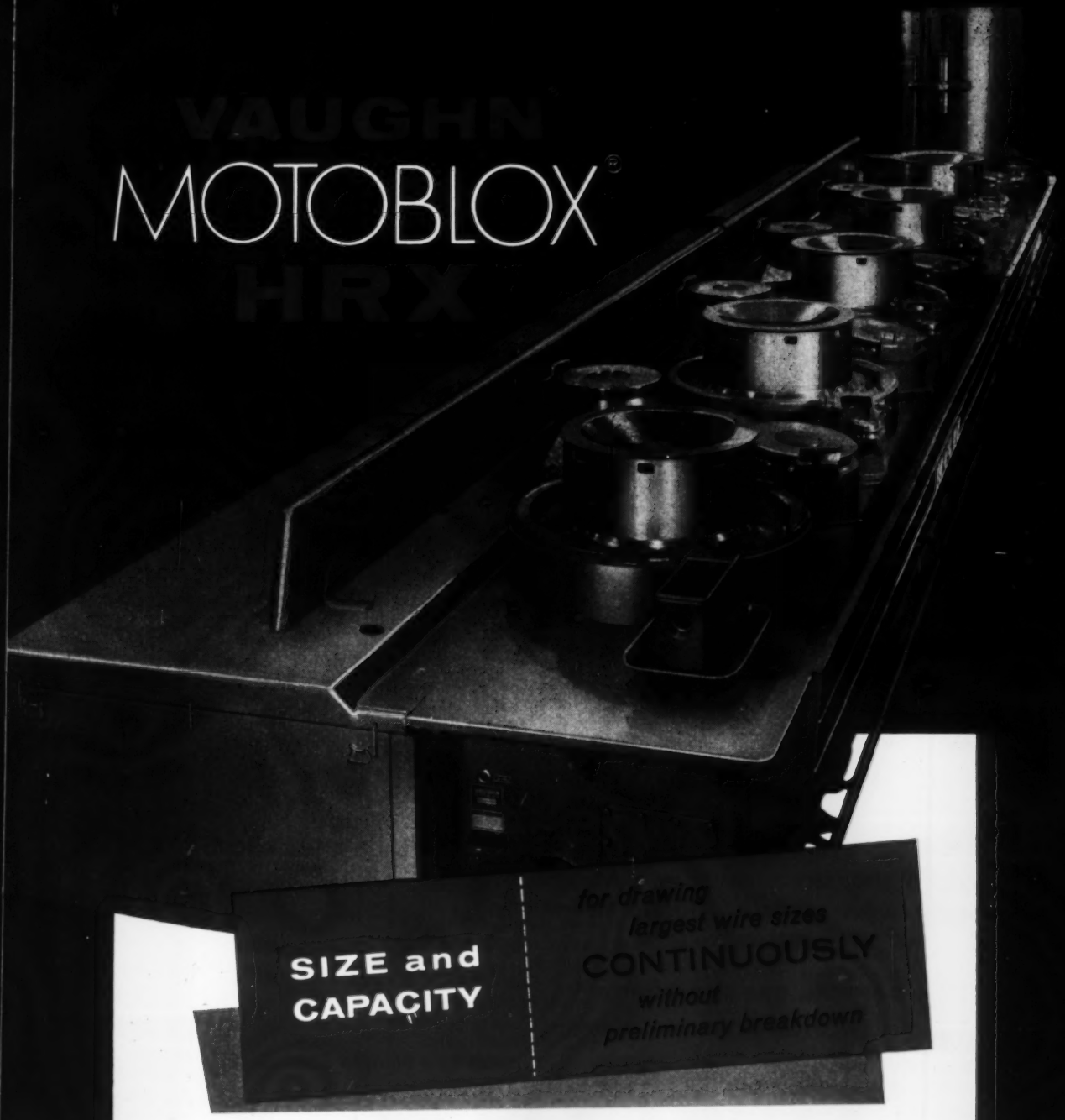
Chicago Pneumatic Tool Co., New York, acquired **Reich Bros. Mfg. Co. Inc.**, Terre Haute, Ind., and will operate it as the Reichdrill Div. The firm makes truck and crawler mounted hydraulic rotary blast hole drills, and drilling rigs. The acquisition also included **Reichdrill Mfg. Co. Ltd.**, Glasgow, Scotland.

National Supply Co., Pittsburgh, purchased **Fluid Packed Pump Co.**, Los Nietos, Calif., maker of downwell pumping equipment for oil country use. The property will be operated as a division with Sidney Shuman as chief executive officer.

Fostoria Pressed Steel Corp., Fostoria, Ohio, **Chempump Corp.**, Philadelphia, and **Zenith Engineering Corp.**, Philadelphia, will merge to form Fostoria Corp. Fostoria makes industrial lighting units, electrical infrared ovens, and sealless pumps and through its subsidiary, Safway Steel Scaffolds Inc., scaffolds, bleachers, and allied items. Chempump makes sealless pumping equipment. Zenith, an affiliate of Chempump, is an engineering development and patent holding company.

Van Norman Industries Inc., New York, acquired working control of

VAUGHN MOTOBLOX® HRX



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for drawing largest wire sizes **CONTINUOUSLY** *without preliminary breakdown*

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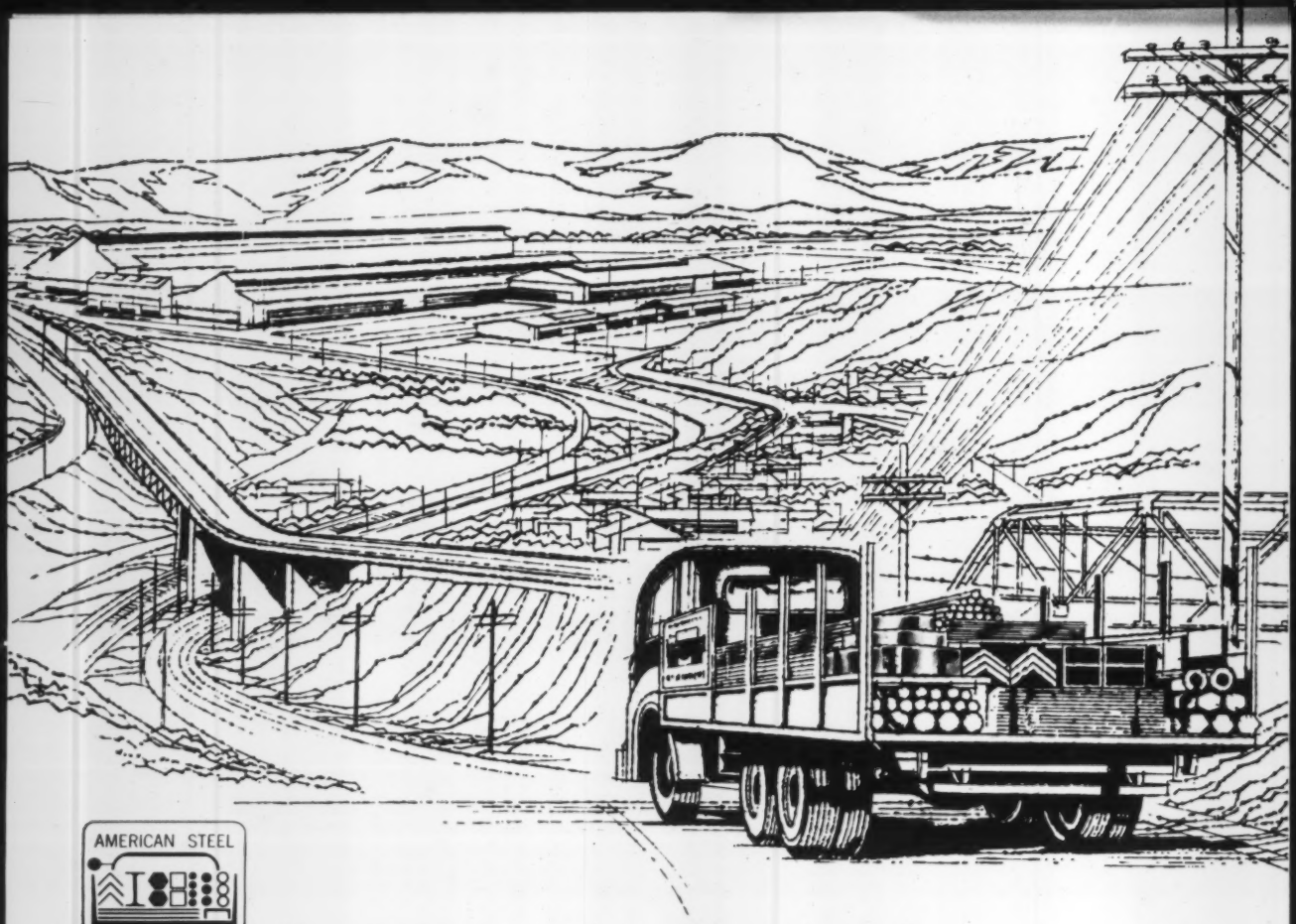

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American Pulley Co., Philadelphia. C. F. Myers is president of both firms. American Pulley makes power transmission and material handling equipment and pressed metal specialties.

American Aluminum Co. and **Cochran Foil Corp.** have merged with **Anaconda Aluminum Co.**, subsidiaries of Anaconda Co., New York. Anaconda organized the American Aluminum Co. in 1958 for the purpose of the merger. That corporation is being dissolved.

Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y., a subsidiary of Anaconda Co., New York, is purchasing **Sequoia Wire & Cable Co.**, Redwood, Calif., from Mandrel Industries Inc. It will operate the company as a wholly owned subsidiary for the manufacture of small wire for use in aircraft, missiles, and electronic controls. Mandrel will continue to produce electronic instruments and custom assemblies at its Burbank, Calif., plant.

American Steel Foundries, Chicago, will purchase **South Bend Lathe Works**, South Bend, Ind., subject to approval of stockholders. The company makes metalworking lathes and other machine tools and accessories. R. E. Frushour will continue as chief executive officer of the South Bend firm.

ASSOCIATIONS

National Screw Machine Products Association, Cleveland, elected these officers: President, L. R. Schaffer, Mechanical Art Works Inc., Newark, N. J.; vice president, C. L. Kerr, Kerr-Lakeside Industries, Cleveland; and treasurer, R. G. Herker, Herker Screw Products Inc., Milwaukee. Orrin B. Werntz was re-elected counsel and executive vice president; Margaret S. Ballinger, secretary.

American Zinc Institute, New York, elected these officers: President, R. G. Kenly, New Jersey Zinc Co., that city; executive vice president and secretary, J. L. Kimberley; treasurer, G. H. LeFevre, U. S. Smelting, Refining & Min-

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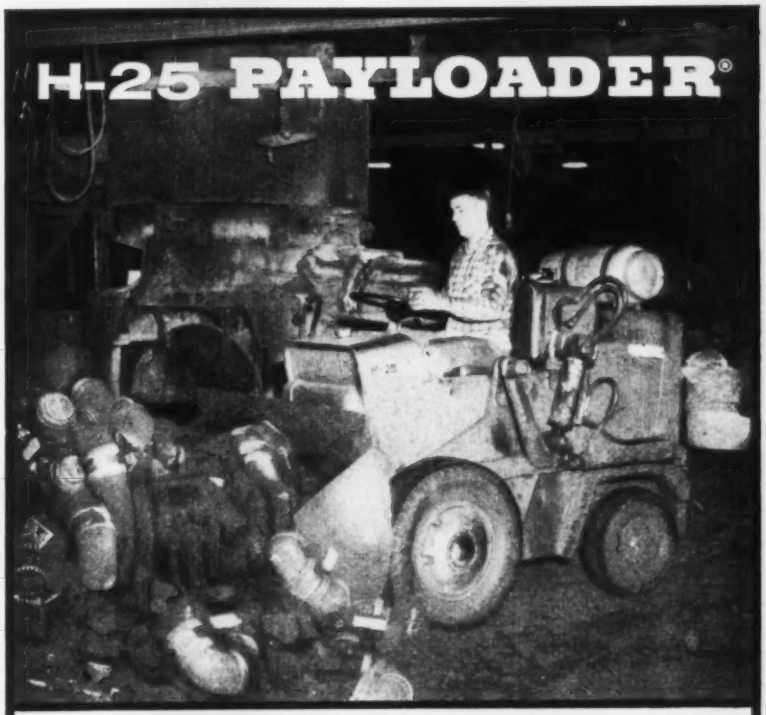

"moves 25-30% more material"

Bremen Gray Iron Foundry, Inc., Bremen, Ind., has been using "PAYLOADER" tractor-shovels for 9 years and has developed an efficient "PAYLOADER" sand-handling set-up.

According to General Manager, H. J. Hueni, their Model H-25 with 1,500 hours of service is an 11 to 16-hour work horse each night. It moves the castings and sand (about 250 tons) from the floor to the shake-out about 200 feet distant. On return trips, it delivers sand (about 210 tons) from muller to the 35 molding stations.

Night Foreman, Gene Hawkins says, "No getting around it, our 'PAYLOADER' units do lots of work and require few repairs. The Model H-25 has greatly improved material-moving efficiency. Its larger capacity, combined with power-shift transmission and power-steer, are the main reasons it moves 25 to 30% more tonnage an hour than our Model HA's."

More power—more traction
Backing up the increased carry capacity (2,500 lbs.) and faster cycles of the Model H-25 are greater engine power, power-transfer differential and 4,500 lbs. of bucket breakout force that provide more reliable traction and digging power . . . all accomplished while reducing the turning radius to 6 feet.

If you want the most carry capacity on the shortest-turning tractor-shovel for sustained high output, ask your Hough Distributor to demonstrate a Model H-25.

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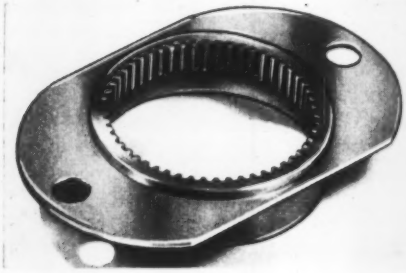
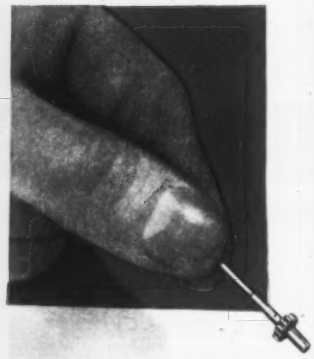
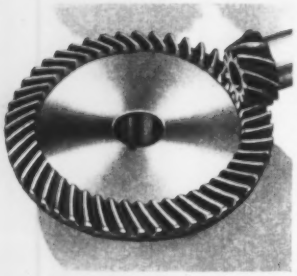




if precision is your problem . .



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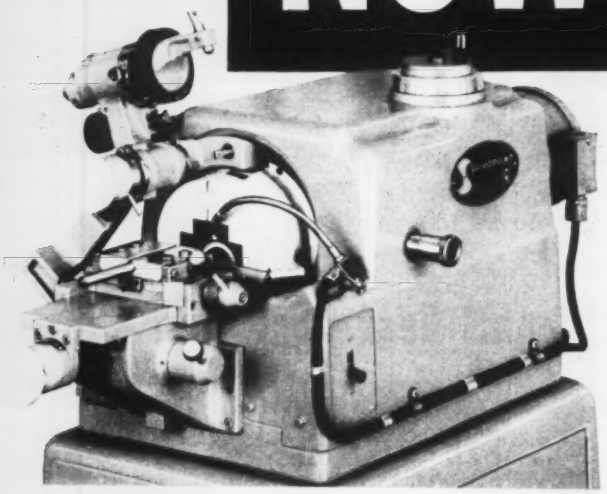

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(*Concluded from Page 137*)

ing Co., New York; and vice presidents, T. A. Campbell, Anaconda Sales Co., New York, H. D. Carus, Matthiessen & Hegeler Zinc Co., LaSalle, Ill., and E. H. Snyder, Combined Metals Reduction Co., Salt Lake City, Utah.

Ductile Iron Society has been organized by producers in the U. S. and Canada. Officers are: President, R. S. Thompson, H. P. Deuscher Co., Hamilton, Ohio; vice president, William Beatty, Morris Bean Co., Yellow Springs, Ohio; secretary and treasurer, R. K. Guise, Huhn's Bros. Co., Dayton, Ohio. James H. Lansing was named executive secretary. Mailing address of the society is P. O. Box 858, Cleveland 22, Ohio.

American Society of Tool Engineers, Detroit, elected these officers: President, Wayne Ewing, Arrowsmith Tool & Die Co., Los Angeles; treasurer, C. M. Smillie, C. M. Smillie Co., Ferndale, Mich.; secretary, H. Verne Loeppert, Boyd Wagner Co., Chicago; executive secretary, H. E. Conrad, Detroit; assistant executive secretary, A. R. Putnam, Detroit; and vice presidents, H. Dale Long, Scully-Jones & Co., Chicago, William Moreland, F. E. Myers & Bro. Co., Ashland, Ohio, D. A. Schrom, York Div., Borg-Warner Corp., York, Pa., and P. R. Marsilius, Producto Machine Co., Bridgeport, Conn.

American Welding Society, New York, elected these officers: President, C. I. MacGuffie, Air Reduction Sales Co., New York; first vice president, R. D. Thomas Jr., Arcos Corp., Philadelphia; and vice president, A. F. Chouinard, National Cylinder Gas Co., Chicago.

NEW PLANTS

E. F. Houghton & Co., Philadelphia, opened its new warehouse and office in Carrollton, Ga., and is completing construction of an adjoining plant. Upon completion of the installation of manufacturing equipment, defoamers, wetting agents, detergents, lubricants, metalworking and heat treating products will be produced locally.

DIES TO WORK MICA AS PRECISELY AS THIS

require the critical inspection that only the Kodak Contour Projector provides.

SPECIAL HIGH-PRECISION DIES are needed to stamp out an intricate mica blank like this, used for positioning electronic tube elements.

Tolerances are on the order of ±0.0002″. In making such dies the firm of Schneider and Marquard, Inc. (specialists in punches and dies for precision mica products) was not satisfied with the accuracy limitations of ordinary inspection methods, and turned to *optical* inspection.

Even then, they found that only one instrument could provide the extremely precise degree of inspection needed, with unparalleled accuracy on all parts of the screen image. That instrument was the Model 30 Kodak Contour Projector.

Accuracy, plus . . . With this large-screen (30-inch) comparator you get a projected image that's as *free* from distortion as the science of optics will permit—accuracy on *every* inch of the viewing screen, including the very edges.

You get a sharp, high-contrast image that's erect and unreversed at all magnifications. Changes in magnification can be made at the flick of a switch.

More refinements . . . You also get efficient head-on surface illumination and a full 16″ throat clearance between collimator lens and front mirror. This clearance is constant at *all* magnifications, permits staging of large parts without repositioning. The many other advanced refinements, extreme optical stability, and rugged construction of the Model 30 Kodak Contour Projector make it a leading choice for large-screen precision micrometry or routine gaging.

Cut inspection costs . . . Along with accuracy, optical gaging with Kodak Contour Projectors offers you savings in tool costs, increased inspection rates, and the economies that result from a minimum of operator training.

You can use optical gaging almost anywhere in your plant . . . receiving, assembly, production, inspection, or toolroom. There are 6 Kodak Contour Projectors to choose from, one matched to your inspection needs.

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THE CHROME YOU NEED
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You can now reduce your chromium and silicon costs with CHROM-ADD 25-5, a new exothermic alloy from Ohio Ferroy-Alloys.

CHROM-ADD 25-5 was developed specifically as an economical way to add chromium and silicon to open hearth steel. CHROM-ADD 25-5 embodies the convenience and consistently high alloy recovery you've come to expect of exothermic ladle additions. Costs are competitive with practices that now require furnace additions of lump alloys. You also eliminate the costs of weighing and handling bulk alloys, save furnace time . . reduce fuel and refractory costs.

CHROM-ADD 25-5 is packed in sealed steel cans each containing 25 lbs. of chromium and 5 lbs. of silicon. For each 1% chromium addition, you get .20% silicon. Consequently, supplemental ladle additions of ferrosilicon are substantially reduced or, in many cases, not required at all.

Get the facts now on CHROM-ADD 25-5 . . . the accurate, convenient and economical way to produce chromium steel in the open hearth. Our nearest sales office will be glad to give you full details.

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ANOTHER ADVANTAGE: Pallets holding sixty cans for convenient handling and storage.

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Technical Outlook

May 11, 1959

COMPUTER CONTROLS FLAME CUT— The British have a new oxyacetylene cutting machine which is controlled by a computer to make more accurate cuts in ship plates. *Welding & Metal Fabrication* reports that at least two British shipyards plan to construct entire bulkheads before cutting them with the computer-controlled machines to fit mating parts. The development is said to practically eliminate problems with accurate fitups.

CUTS PORCELAIN ENAMEL COST— A new Virginia rutile (a constituent of porcelain enamel frits) is a replacement for more expensive white titanium dioxide, says Metal & Thermit Corp., Rahway, N. J. It modifies the whiteness of white enamels less than older types of rutiles. If some off-white can be tolerated, it can replace all of the titania in enamels for hot water tanks, washing machines, and stove interiors.

LIGHTER STRUCTURALS TO FORE— Some steel firms, aware of the trend to lighter, more efficient construction needs, offer lighter structurals for equipment makers. Dorsey Trailers Inc., Elba, Ala., uses such a structural made by Jones & Laughlin Steel Corp., Pittsburgh, for cross-sills. The trailers can support more than six times their own weight.

ANNEALING PROGRESS— Steel sheets are expected to be annealed more economically in a direct fired gas furnace being developed. The aim: Fuel savings over present radiant installations. Salem-Brosius Inc., Pittsburgh, is also working on continuous fuel-fired annealing of aluminum coils and induction annealing of nonferrous metals.

DIP PACKAGING—Two new, easily stripped compounds are available. Parts are simply dipped in a hot liquid (one is applied at 120° F; the other at 350° F). Unlike versions based on World War II formulas, the 350° F coating is effective at 165° F; both are flexible at minus 65° F, an important factor in air transportation. The 120° F film has a built-in fungicide and is best suited for delicate instruments and optical parts. The developer, Army's Aberdeen Proving Ground, Maryland, says the specifications are available for civilian use.

ZINC FOR BETTER SOLDER—Tests have shown that a solder composed of 30 per cent zinc and 70 per cent tin is the best combination for strength and corrosion resistance in joining uranium to aluminum. Battelle Memorial Institute, Columbus, Ohio, used foils, plating, and dipping before heating the elements for joining.

FOR SPACE AGE PRODUCTION— Ion engines for space vehicles will be produced by Goodrich-High Voltage Astronautics Inc., Burlington, Mass., a new firm. It was formed by B. F. Goodrich Co. and High Voltage Engineering Corp.

CERAMICS LIGHTEN MOTORS— A better ferrite developed by General Ceramics Corp., Keasbey, N. J., is said to improve the efficiency of high frequency power inversion. Replacing a conventional 60 cycle alternating current motor with one that operates on 1000 cycles can cut motor weight in half.

WHAT'S THE BEST CLEANER?— You can find out in report PB 131964, available from the Department of Commerce, Washington 25, D. C. It contains data assembled by the Navy on various cleaners and passivaters for use with corrosion resisting steels.

Rx FOR DUCTILE IRON— EM alloy 55 permits magnesium recoveries up to 50 per cent when making ductile iron, says Union Carbide Metals Co., a division of Union Carbide Corp., New York. The new formula minimizes temperature loss, pyrotechnics, and the inefficiencies of tramp metals.

Metalworking Outlook—Page 91

Market Outlook—Page 195

Lathe Can Advance with Technology

Building block principle allows it to be updated. Welded steel construction adds needed rigidity. Clearing says price is competitive with units of conventional design

SOME manufacturers build planned obsolescence into their products, but Clearing Div. of U. S. Industries Inc., Chicago, is building its new Blue Chip lathes to last indefinitely.

Of rigid, welded steel construction, the lathes are designed to use carbide and ceramic cutting tools to machine the high strength alloys being developed. The headstock, which contains the drive and operating controls, is built as a separate unit and can be assembled to a bed of any size. It is also possible to replace the manual speed selection with electropneumatic controls.

Here is a lathe that you can modify as production requirements change and modernize as new developments appear.

• Clearing is promising 30 day delivery.

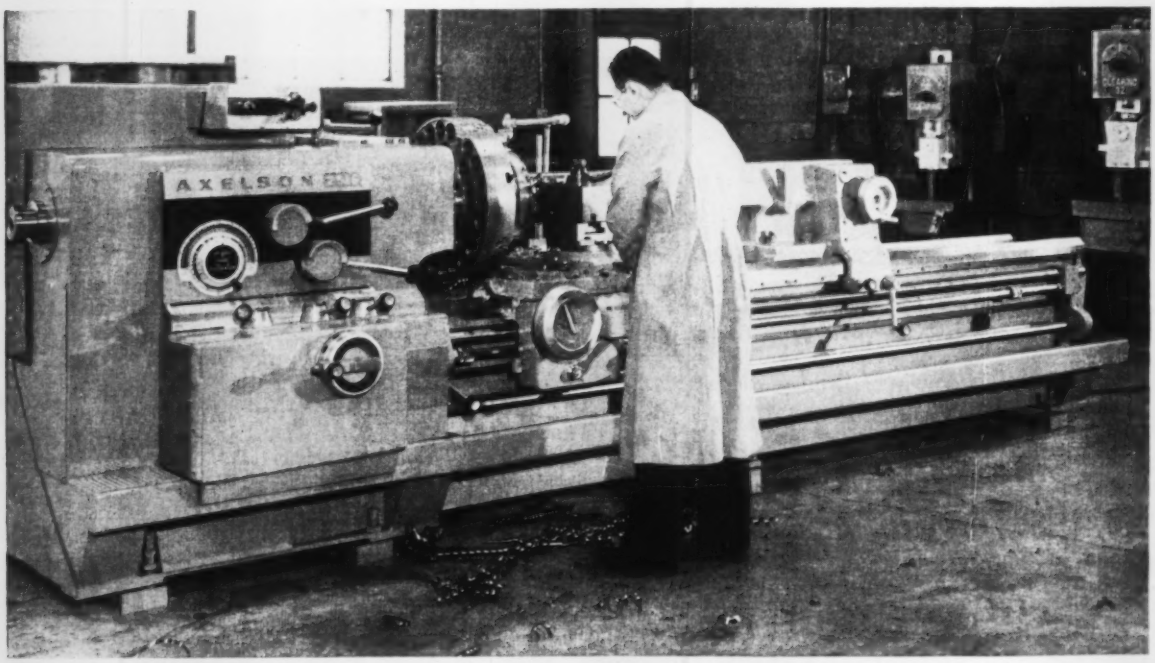
The company has already sold two machines and has 12 more in production. Paul M. Stanton, manager of the Machine Tool Div., says he will stock components so that an assembly job is all that's required when an order is received.

Clearing's distribution and service organizations are set up for the Blue Chip line. Later this year, the company's west coast plant will start assembling models for distribution in that area.

• Welded construction was a natural for the builder.

Clearing is a pioneer of welded steel fabrication in the hydraulic and mechanical press field. In 1958, when U. S. Industries realigned product lines within its divisions, redesign of the Axelson lathe was handed over to Clearing. That division soon established that welded steel construction was the only practical way to achieve the degree of rigidity it wanted.

The new Clearing-Axelson lathe has 18 times greater rigidity than equivalent cast iron construction, says Mr. Stanton. The bed has continuous reinforcement from end to end; the pedestal, bed, and ways are built as an integral unit. Fur-



Rigidity of the Clearing-Axelson lathe is increased by its welded steel headstock and bed. Carbide or ceramic tooling can be used to machine the toughest alloys. Beds of any size and type can be attached to the self-contained headstock

ther, the front wall of the bed which takes most of the force of the cutting loads has been extended to the floor. The chip pan extends considerably forward and adds strength to the entire structure.

Ribs are placed inside the structure so that a series of pyramid shapes are formed. The reinforcing ribs also serve as the wall of the chip disposal chutes in the bed.

The welded steel headstock is built independently. A thick, wide flange provides secure mounting to the bed.

In a test to show STEEL editors the rigidity of the machine, Clearing engineers hoisted the tailstock end of the lathe about a foot off the floor and jiggled it while taking a cut on a 1045 steel forging, 7½ in. in diameter. The tool was taking a 5/16 in. bite out of the forging while the work traveled at about 300 sfpm.

When miked, variation in the 15 in. long cut was found to be about 0.002 in.

• Cast construction was used for the quick-change gear box, tailstock, apron, and cross slide for economy and appearance.

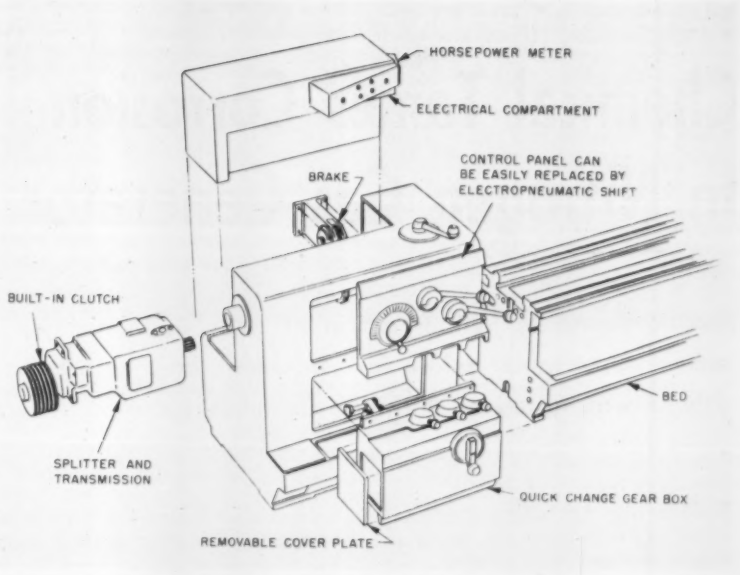
Those machine members are relatively small in size and would require a multiplicity of small details to form the walls, ribs, and bosses. It would not have been economical for Clearing to fabricate the parts in its weld shop.

The builder feels that judicious use of castings is an economical way to obtain styling effects. They can dramatically embellish weldments which are kept straight and clean for ease and cost of fabrication.

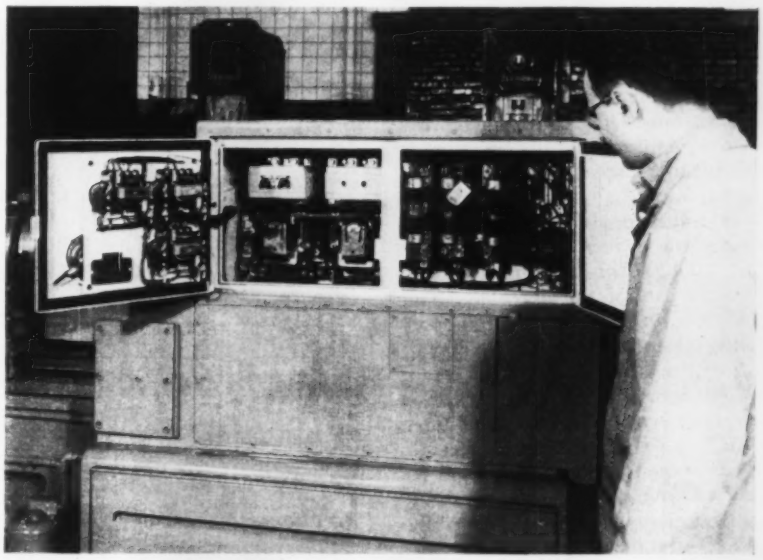
• The lathe has 40 spindle speed changes at closely spaced intervals and 88 carriage and threading feeds.

Speeds up to 2000 rpm make it possible to machine any material with maximum efficiency. A 50 hp main motor delivers torque to the spindle. Rough threading and heavy interrupted cuts are easily handled without perceptible chatter.

Unitizing has been carried out on every major component of the headstock. Drive gearing, quick change gear box, and electricals may be removed as units to simplify servicing. The feed gear box is completely enclosed and attaches to the front of the machine. All electrical accessories are contained in a common enclosure that mounts in a recess in the headstock.



Unitized design of the headstock allows easy accessibility of all components. Drive gearing, quick change gear box, and electricals can be removed as units



Electrical controls are mounted in an enclosure at the rear of the headstock. They can be easily reached for routine servicing

• Electropneumatic power shifting can be added.

Standard gear shifting on the Blue Chip is manual. A four position and a five position lever operating in two ranges take care of all speed changes. Power can be added at any time since factory installation is not required.

Clearing also is working with General Electric Co. on a numerical control system that can be adapted to the lathe.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Chemical Tames Corrosion In Nitrogen Gas Generator

Sodium vanadate inhibits action of aqueous monoethanolamine. See table below for corrosion rates before and after it was tested at Michigan Seamless plant

HERE'S help for heat treaters and fabricators with corrosion problems in nitrogen gas generators that use monoethanolamine (also known as MEA) to remove carbon dioxide from furnace atmospheres.

Dow Chemical Co., Midland, Mich., has confirmed the effectiveness of sodium vanadate as a corrosion inhibitor in aqueous MEA solutions. For more than two years, the chemical has controlled corrosion in a nitrogen gas generator at Michigan Seamless Tube Co., South Lyon, Mich.

The firm produces seamless pressure, heat exchanger, and mechanical tubing. Annealing is a fundamental part of the operation. The furnaces must have an inert atmosphere free from carbon dioxide to prevent scaling.

The atmosphere is produced in a nitrogen gas generator that uses MEA to remove carbon dioxide. When the carbon dioxide is removed from the combustion gases, corrosion products build up in the MEA solution.

• Corrosion products attack many parts of the closed circuit process.

Air, with a certain amount of added natural gas, is used to make up the fuel for the generator. The gas travels into a combustion chamber where nitrogen and carbon dioxide are the major combustion products. It next moves into a heat exchanger, and then into an absorber where the MEA solution removes the carbon dioxide from the atmosphere.

From there, the gas passes through a refrigeration unit and finally into a dryer that lowers the water content still more. The result is a dry gas that provides a protective atmosphere for the tubing.

A second recirculating system is for the MEA solution. A reboiler strips the solution from the carbon dioxide, after which the MEA is passed through heat exchangers. It is then returned to the absorber tank for re-use in removing carbon dioxide.

• Michigan Seamless had a serious corrosion problem for about three years.

Piping failures were the most frequent. After the generator had been in operation only a few months, some piping had to be replaced almost monthly—especially that which carries rapidly circulating MEA from the combustion chamber.

The reboiler also corroded, particularly in the area of the combustion chamber which is surrounded by MEA solution. The outside of the fire chamber corroded heavily, as did the interior of the reboiler's outer shell. The reboiler had to be replaced long before its usefulness would normally have ended.

By 1955 (three years after the installation), the problem had become so crucial that serious thought was being given to replacing all parts affected by the MEA solution with stainless steel.

• Consulted on the problem, Dow chemists thought they had the answer.

Their idea was to put a quantity of sodium vanadate into the MEA solution. Since the chemical had shown great promise as a corrosion inhibitor in laboratory tests, the hope was that it would be equally effective in field tests.

Their reasoning traced back to a

Case History of Sodium Vanadate in Action

BEFORE	1 month weight loss	Penetration per year
Rich MEA	13.0 grams	98.9 mils
Lean MEA	12.3 grams	93.5 mils

AFTER	2 month weight loss	Penetration per year
Rich MEA	0.0009 gram	0.013 mil
Lean MEA	0.0016 gram	0.024 mil
	3 month weight loss	**Penetration per year**
Rich MEA	0.0016 gram	0.016 mil
Lean MEA	0.0017 gram	0.018 mil

theory on how sodium vanadate reacts with iron. Iron is assumed to be normally covered with an oxide film that has many pores or cracks. Through these openings, ferrous ions are given up to pass into solution. When sodium vanadate is present, the emerging ferrous ions are converted to ferric ions. They react with water to form an insoluble oxide that plugs the pores, sealing the iron surface against further reactions. So in this case, the escape of ferrous ions is inhibited.

• An initial step toward finding the answer to the corrosion problem was to get an accurate reading of its extent.

Pipe nipples were used as specimens. They were put into the lean and rich MEA lines on Aug. 30, 1955, and left there one month.

Results: Weight loss on the lean side was 12.3 grams, and penetration per year was rated at 93.5 mils. On the rich side, weight loss was measured at 13.0 grams, and penetration per year was established at 98.8 mils.

Sodium vanadate was introduced in the system Nov. 13, and two sets of mild steel strips were installed at the same time. One set was removed Jan. 14, 1956, revealing impressive results with the inhibitor. Rich side weight loss was only 0.0009 gram and the lean side weight loss was measured at 0.0016. Penetration per year was 0.013 mil on the rich side, and 0.024 on the lean side.

In February, the other set of strips was removed. Findings: Rich side weight loss was 0.0016 gram, and lean side weight loss was 0.0017 gram. This meant that the penetration per year was only 0.016 mil for the rich side and 0.018 for the lean side.

Weight loss and penetration, originally greater on the rich side than on the lean side, were shown to be larger on the lean side after the inhibitor was added. The precise figures are insignificant, say Dow chemists; what is important is the pronounced trend toward corrosion control that they indicate.

This is particularly true in the case of Michigan Seamless. In the first place, differences between lean and rich side mixtures are not sizable. Also, corrosion is now so minor that another reading might well show that rich side losses were again larger than lean side losses and still insignificant.

• Dow chemists periodically analyze the inhibited MEA to make sure the proper level of sodium vanadate is being maintained.

The system is drained annually and replaced with a new solution which includes from 10 to 15 lb of sodium vanadate.

"The result is that corrosion has been well controlled for more than two years," says Edward Zywiec, assistant to the chief engineer at Michigan Seamless. "Considering the problem we were up against, the inhibitor has given us all the help we have hoped for."

SAFER X-RAY UNIT means faster operation. This Picker unit is connected to a television screen and an amplifier which enlarges and intensifies the image. The radiographer is checking operation of a gear

Viewer Shows Inspectors Maximum Passable Defects

Inspectors can be shown maximum passable defects with a three dimensional viewed at Timken Roller Bearing Co., Canton, Ohio.

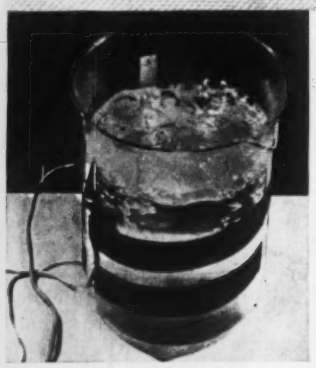
The technique is especially suited for on-the-job training of inspectors. The trainee rarely has the opportunity to see all defects in this category. Sets of standard samples may be difficult to obtain. They can rust, discolor, or be misplaced. With the viewer, all trainees in all plants can be shown one standard set.

Samples of defects in components for bearings, cups, cones, cages, and rollers are photographed in 3-D.

Positive transparencies stripped into a continuous roll are sent in viewers to all plants for training and quick reference.

Wide Use Predicted for New Graphite Fabric

- **Reinforcing refractory material**
- **High temperature heating elements**
- **Vacuum tube grids, infrared emitters**
- **Static eliminators and lamp filaments**
- **Jet engine seals**
- **Thermal or acoustical insulation**



Resistance Heating

Lamps

Heat Resistance

A PROCESS to convert organic textile forms directly to graphite with a purity exceeding 99.9 per cent has been developed by National Carbon Co., a division of Union Carbide Corp.

Only experimental quantities have been produced so far. They are being tested and evaluated by industrial and military personnel.

Graphitizing is accomplished by electrically heating a fiber or fabric such as rayon to about 5400° F. The crystalline structure of the material is changed. The graphite formed is similar to the manufactured type used for electric furnace electrodes, nuclear reactor structures, metallurgical molds, and other industrial products.

• Nearly every segment of industry eventually may benefit from the development.

That's because graphite has a unique combination of electrical, chemical, mechanical properties.

At ordinary pressures, graphite has no melting point, and sublimes at extremely high temperatures (about 6600° F). It gets stronger at higher temperatures, and tensile strength at 4500° F is about twice that at room temperatures.

Above 750° F oxidation sets in. The known properties are unaffected by liquid nitrogen at −320° F.

• Graphite fibers and fabrics can give electrical and thermal conductivity to such materials as plastics, ceramics, and glass cloth.

Graphite textiles resist attack by acids, alkalies, and organic compounds (except highly oxidizing types), and are unreactive with many molten metals. Electrical and thermal conductivity is good and they're immune to thermal shock.

The material is being considered for filtering hot nonoxidizing gases; corrosive fuel handling; electrostatic precipitators, curtain walls, and flame arresters.

Fiber resistance heating elements can operate at high temperatures. Possibilities include home panel units.

• The material is being evaluated as a reinforcing agent for high temperature plastics and refractories, especially for those subject to thermal cycling.

Possible mechanical applications include valve packing and gasket materials for high temperature seals as in jet engines. Conveyor belting for high temperature equipment is another possibility.

Use as thermal or acoustical insulation is also being explored.

New Machine Boosts Builder Sales

The special is being turned out in job lots, thanks to a warm reaction from customers and potential customers. New business will accelerate the company's recovery

ONE of the surest ways to hoist a company out of a recession rut is to come up with a revolutionary product that customers need.

The Milwaukee-Matic, the tape controlled milling, drilling, and boring machine that changes its own tools, is proving itself to be a recession buster for Kearney & Trecker Corp., Milwaukee.

Francis J. Trecker, president, told STEEL that the company's new business in the special machines will be a major assist this year, but it's also accompanied by growing volume in standard machine tools that K&T builds. Production of standards is slated to jump 52 per cent from the first quarter to the fourth quarter.

In the same period, production of Milwaukee-Matics will follow a planned pace. The rate will be at least one a week by the yearend.

At the company's special machine plant, on Milwaukee's west side, the new machines already are moving down the production line. The first lot of ten is nearly finished; one has been shipped to GE, the control builder; and another is set up in a demonstration area. The second lot of ten machines has entered the first production stages.

• **Sales are based on estimated savings that sometimes seem fantastic.** Only a few weeks ago, K&T representatives called on an aircraft subcontractor in San Diego, Calif. He showed them a part that he had to produce regularly—a complex job that swallowed up 65 hours of machining. He figured the Milwaukee-Matic would do it in 4½ hours.

Such savings have resulted in 23 firm orders for the machines. (They sell for about $140,000 each.) An aircraft company signed up for five.

The manufacturing vice president of a large, multiplant corporation told K&T officials that he figured his company would need about 60 in the next few years.

To further the optimism in Milwaukee, letters of intent (usually separated from orders only by paperwork and red tape) are in on at least 23 more machines. And inquiries continue to pour in.

Coupled with a general machine tool recovery, the dollar volume in Milwaukee-Matics should help K&T back to a near record pace.

Split-Hair Positioning

At a press preview of a numerically controlled positioning table (STEEL, May 4, p. 98), executives of American Tool Works, Cincinnati, came up with a demonstration that had the controlmakers, Sperry Corp. of Canada, Montreal, Que., nervous.

A dial indicator, graduated in ten-thousandths of an inch, was put on the saddle and zeroed against the table. Then the tape was put in action. It moved the table, a ten thousandth at a time.

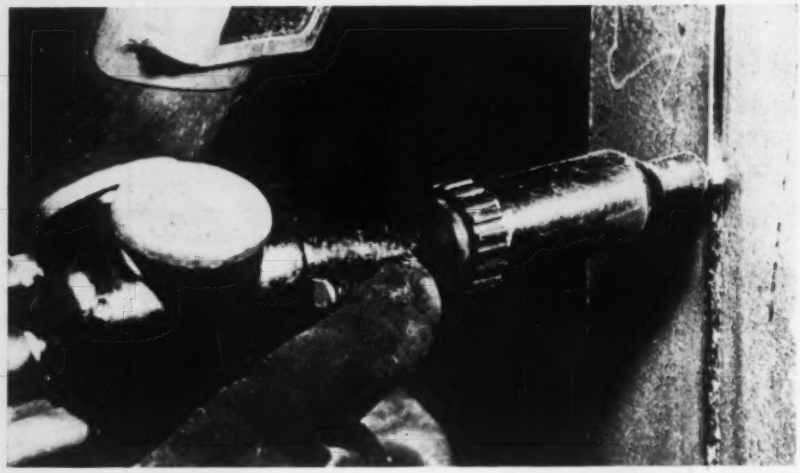
The demonstration worked. Key to the precision: Hydraulic drive for the table that precluded backlash, play, or windup in the system.

More on Tape Control

Sperry (Canada), the same company that tailored the control system for American Tool Works, is adding the control to two DeVlieg jig mills for Pratt & Whitney Aircraft Corp.

K&T's Francis J. Trecker: "The machine's ability to change these tools automatically, and to use them, has given us a sales success that will justify a production schedule of at least one machine a week before the end of the year"

Even Rookie Welders Can Use This Method



Fine wire, lower current and voltages add up to a new technique called Dip Transfer. The cycle shown at right is repeated 100 to 200 times a second

A NEW technique, called Dip Transfer, greatly simplifies carbon dioxide shielded, semiautomatic welding.

Designed and marketed by Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, the system relies on fine wire (0.045 in. or less), low voltage and current (19 volts, 200 amperes), and a small weld pool to produce spatterfree, strong welds in mild and low alloy steels.

In unveiling its method at the recent welding show in Chicago, Airco pointed to these additional advantages: 1. An unskilled person can learn to operate the equipment satisfactorily in less than 30 minutes. 2. He can weld fillets or butt joints on 16 gage metal in any position—vertical, horizontal, or overhead. 3. Spatter losses are less than 5 per cent. 4. An operator can lay down 6 lb of weld metal an hour. 5. The same equipment can be used for other conventional, inert gas shielded techniques with standard size wires.

• Reliability is tied to a dip and break cycle between the wire and the molten pool.

Arcwelding has always required skillful control of an open arc. An operator strikes an arc between an electrode and the work to form a puddle of weld metal. That's where skill, training, and experience count heavily. Poor arc control can bring about cold welds, inclusions, skips, spatter, and other problems.

Dip Transfer gets around the need for such control by its dip and break. Metal is melted by a wiping action during a short circuit. (It is not projected through an arc stream.) Short circuits are caused by the wire dipping into the weld pool. The short circuit puts a load on the power supply, creating a current surge. Before the current reaches its peak, the wire overheats and melts into the weld pool. Contact is then broken (with an assist from an electromagnetic pinch) and a fairly high current arc is established.

The make and break effect creates a kind of steady pulsing which can be varied by power supply adjustments. As in regular consumable electrode welding, wire feed is controlled or regulated by current level.

• Power source must be made especially for this application.

Inductance has a regulating effect on the arc cycle. Power supplies must provide a constant or rising voltage under increasing loads (called constant or rising potential). Current levels are below 200 amperes to keep the puddle small and easy to manage.

The Airco welding gun has drive rolls to pull the wire through the long casing and avoid buckling which sometimes occurs with pusher feeds.

ACHESON

dispersions digest

Reporting uses for

dag® BRAND DISPERSIONS

COLLOIDAL DISPERSIONS OF GRAPHITE, MOLYBDENUM DISULFIDE, AND OTHER SOLIDS

SUPERIOR CASTINGS, LONGER DIE LIFE ATTRIBUTED TO 'DAG' DISPERSIONS

Die casters and molders are expressing a growing preference for Acheson 'dag' brand colloidal dispersions. The consistent high quality of these products and the multiple benefits they offer have obsoleted most other mold cavity coatings. As outlined below, Acheson dispersions greatly aid in the manufacture of more uniformly sound castings having smoother surface finishes, facilitate metal flow and parting, and consequently extend the effective service lives of the dies and molds on which they are used.

Acheson 'Prodag'®, spray-applied on permanent molds at Paragon Aluminum Corporation, has given them consistently higher quality castings and fewer rejects.

Better surface finish with 'Prodag' permanent mold coating is just one of the reasons why Paragon Aluminum Corporation, a Division of Detroit Harvester Company located at Monroe, Michigan, switched to this Acheson product. After four years of experimentation with other mold washes, Paragon chose 'Prodag' — Acheson semi-colloidal graphite in water — and has used it constantly the past seven years. The reasons for its choice are these; uniform consistency, excellent heat-transfer quality, and its hard, smooth, tenacious film which resists flaking and provides easier parting characteristics.

With about 95 per cent of its annual output of more than two million pounds of castings going to the automotive industry, Paragon must insist upon quality. 'Prodag' helps to maintain this standard. These parts for convertible automobile tops are precision-molded from both 355 and 319 aluminum alloy. Molds are preheated before each day's run to 600°F and the casting cycle maintains this temperature. The 'Prodag' dilution ratio is 1 to 4 parts water and is applied to the molds with a commercial spray gun. Aside from occasional touchup at points of greatest wear, this coating lasts through the entire run. Because of the physical contours involved in these comparatively small, light castings, they require rapid cooling in certain areas to insure uniform strength. The 'Prodag' coating — with its proven fast heat transfer ability — allows the castings to cool without breaks or pinholes. And by parting more easily, the high-finish castings which result have given Paragon Aluminum products wide acceptance in this demanding industry.

Typical parts cast at Paragon Aluminum include these automobile convertible top braces. More uniform strength, better finish, and fewer rejects result from this company's use of Acheson 'Prodag'.

If you have a metal casting problem, call in your Acheson Service Engineer. Or if you prefer, write direct for additional information contained in our Bulletin No. 425. Address Dept. S-59.

'dag' and 'Prodag' are trademarks registered in the U.S. Patent Office by Acheson Industries, Inc.

Colloidal graphite increases die life because of its stability at high temperatures, excellent lubricating qualities, and its ability to prevent adhesion and the scrubbing effect of hot metal. This cannot be said of conventional petroleum compounds which either decompose rapidly at temperatures above 300°F or do not possess the required lubricity necessary under good die casting procedures. It will not volatilize when in contact with the hot metal and cause pock marks due to gas formation. It will perform when present in extremely thin films which will not affect dimensions or cause discoloration of the parts being cast. And since it does not volatilize or otherwise be destroyed in the casting process, it does not need to be applied as often as other lubricants. This fact alone has often increased production as much as 25%. Investigate the use of an Acheson colloidal dispersion in solving your die casting problem . . . *It probably is the very answer you need.*

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

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Automation's Taking Over In the Blast Furnace

By J. E. ORAM

Industrial Engineering Section
General Electric Co.
Schenectady, N. Y.

In the future, the blast furnace will be operated by a master control system, an expert says. Automation will permit close control of product quality. Pushbutton, paper tape, or punched card programing may be used; computers, given a charge material analysis, will determine the right amounts of raw materials to be put into the furnace. Needed: Better understanding of the blast furnace process and high speed equipment for recording and processing data.

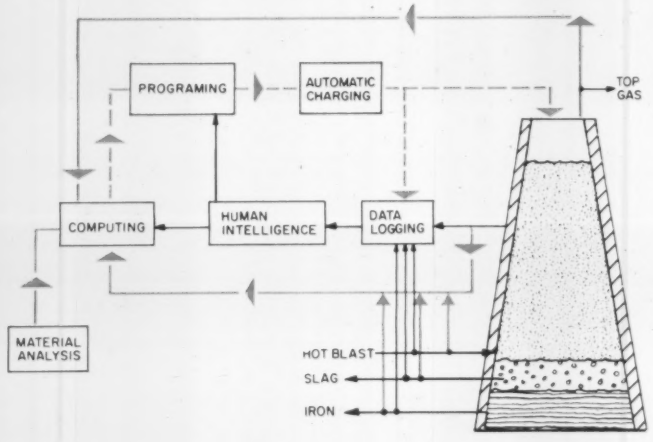
PROCESS control in the blast furnace isn't far away. Some operations are done automatically now, after they're initiated by an operator.

Goal: Make all operations automatic, with each starting as the one before it is finished.

• Automation would permit control of product quality.

Automatic charging, programing, computation of a chemically correct charge, and data logging are successive steps toward complete automation. Each, while offering its own benefits, is a logical step toward control of the whole process, not a random attempt to control an isolated phase.

With operations in the process tied together by a master control system, closer control of product quality would be assured.



Here's how automatic controls may operate the blast furnace of the future. Data collected from the furnace and charge material would be interpreted and fed back into the process control to vary quality or quantity of the product

• The charging operation has been made partly automatic. Complete automation should come in the next few years.

The blast furnace process is closer to complete automation than most others in iron and steel making. Example: The charging system has progressed from crude hand methods to automatic systems used on most modern, high capacity stacks.

Some basic elements of a modern charging system are the balanced skip hoist, the small and large bells, and the stockline recorders. Also included: An automatic coke measuring and charging system, consisting of shaker screens, weigh hoppers with electrically operated gates, a water charging system, and a scale car, for charging ore and other raw materials. Those elements are coordinated by program control; the preset program is established by the furnace operator.

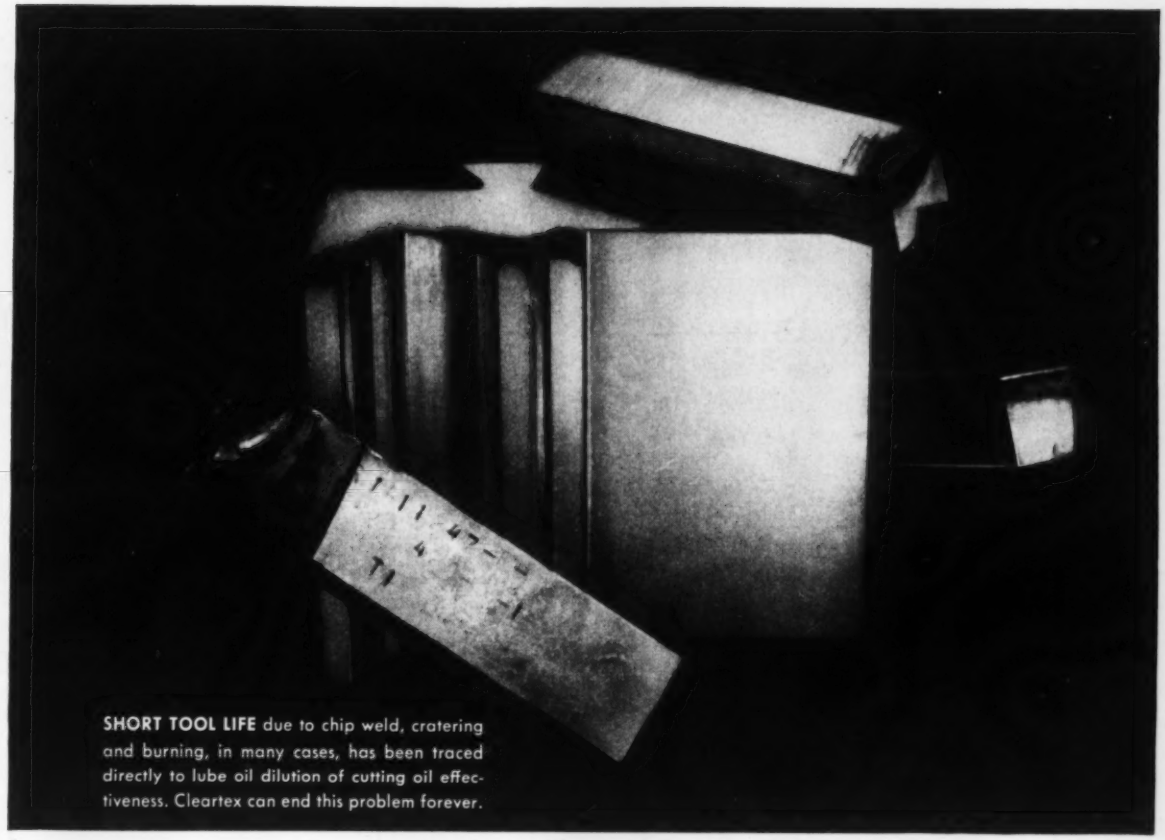
Automatic control has improved blast furnace charging, but inflexible operation of the scale car is still a handicap. Weighing is subject to human error. The completely automated charging system would include an automatic stockhouse system, where each material would be weighed or measured.

When a skip comes to the pit, program control would automatically actuate the conveyor system to load it with the right material. The charge material would then be hauled away and fed into the furnace automatically.

The charging system, started and stopped by the stockline recorders, would maintain a preset burden level in the furnace. Scale car operation and associated human error would be eliminated.

• Programing and automatic charging equipment used is optional; understanding of the blast furnace process is vital.

Pushbutton programing may be adequate for the automated blast furnace because of relatively infrequent changes in the charging



SHORT TOOL LIFE due to chip weld, cratering and burning, in many cases, has been traced directly to lube oil dilution of cutting oil effectiveness. Cleartex can end this problem forever.

Diluted cutting oil shortens tool life drastically

Lubricating oil is probably leaking into the cutting oil sumps of your automatic screw machines as you read this. Current research proves that this is happening in 70% of all the automatics in use today! And where it happens, it shortens tool life by as much as 50%—even 70%. On top of this, the cost of extra regrinds, lost production during tool changes, and excessive scrap production is putting a premium on screw machine operation in too many shops.

Look for these symptoms. One sure sign of dilution is the need for frequent refilling of the lube oil sump. If you are using an ordinary lube oil, this dilution will create two additional—and more costly—symptoms: excessive scrap production and frequent regrinds. Now you can eliminate these forever with the

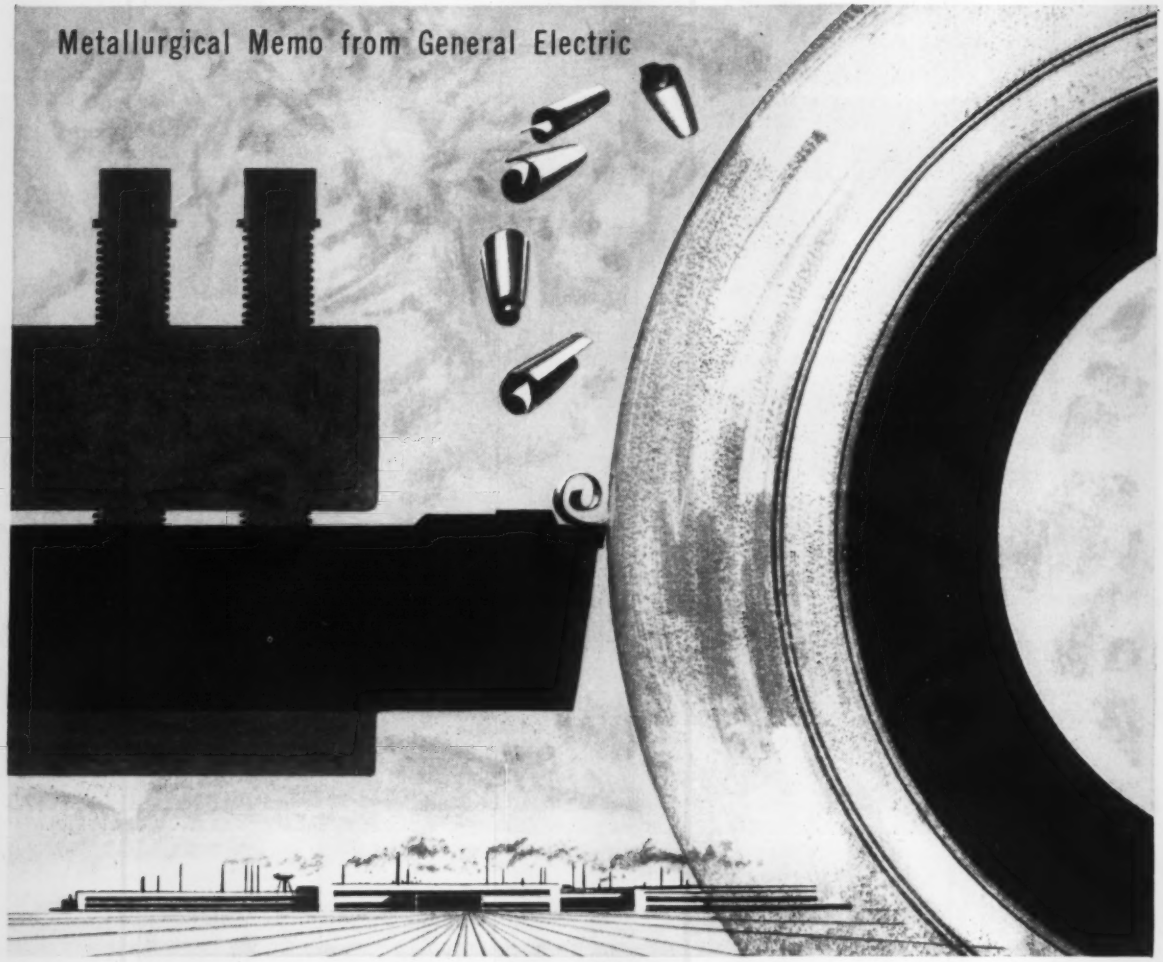
TEXACO CLEARTEX CURE

The exceptional chemical stability and load-carrying ability of Texaco's Cleartex series make them equally suitable for use as cutting oils, lubricants or hydraulic fluids. All you have to do is use them for both cutting *and* lubrication. With Cleartex in *all* your sumps, you'll find cutting oil dilution will stop and screw machine production cost will drop substantially.

Write today for your copy of Texaco's helpful new booklet "Cleartex in Automatic Screw Machines"...and contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. S-FM-21.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



Why 242 different toolholders?

Metallurgical Products Department reports on an expanded new line of Lift-O-Matic toolholders . . . 242 sizes to speed changeovers on every job

Nobody needs to tell you what carbides have done for metalcutting . . . or how Carboloy® disposable inserts have led the way. *But making inserts is only half the job;* the other half is to provide you with toolholders that let you get full value from these miracle metals.

Carboloy Lift-O-Matic toolholders do this job. There are now three types—positive rake, negative rake, and tracer. All provide access to the clamp setscrew from either top or bottom—together with a self-raising chip-breaker clamp—for fastest possible indexing. All cut your inventory needs by providing interchangeability of parts. In addition, there is a full line of Carboloy *heavy-duty* toolholders.

This expanded Lift-O-Matic toolholder line is stocked by your *local* Authorized Carboloy Distributor—3 types, 9 styles, 242 sizes—*plus* the widest range of styles, sizes, and grades of *inserts* in the industry. Call him (see the Yellow Pages under "Carbides"); or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Blvd., Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Coming: Automation of Steelmaking

Cost per ton of steel depends on the steelmaker's ability to make a high quality product in large quantities.

Automatic process control can boost output in iron and steel making areas, as it has in metal rolling and processing.

Blast furnace automation is a logical start; some operations are already automatic, after initiation by an operator.

Process control will help in the sinter plant, open hearth, soaking pit, oxygen converter, and electric furnace.

program. Punched card equipment or automatic reprograming, in response to a process computer, may be used.

Lack of understanding of complex thermal and chemical reactions in iron and steel making often hinders development of automatic process control. Steelmakers have devoted much of their research effort to better understanding of the blast furnace. Some of the more fundamental process equations may already be known, but more must be learned before the blast furnace product can be controlled automatically.

• Periodic computation of the correct burden will make the furnace more stable, efficient, and predictable.

Before long, we can expect to see automatic computation of the charging program. The system would be reprogramed periodically to maintain a chemically correct charge. It's possible now, with modern industrial computers.

Some steelmakers feel they have enough knowledge to write the required equations and define chemical relationships. Needed: A more precise, mathematical definition of present burden calculations.

How often computations would be made would depend mostly on the rate of change in raw material composition. The computer would require raw material analysis methods that could provide accurate data in a hurry. Commercial equipment isn't available yet, but on-line x-ray analysis instruments are being developed.

A chemically uniform charge would improve stability, efficiency, and predictability of the furnace, but the process control loop is still an open one, where functions are initiated by a human operator.

Some of the easily identified local feedback loops may be closed soon, taking part of the human factor out of the process. But first, complex process relationships and their time correlations must be better understood. A careful correlation study, designed to develop controlling process equations, may supply the answers.

• Needed: Accurate process data in a form that lends itself to high speed reduction and study.

Process data are often taken with round chart or strip chart recorders. They can't be processed rapidly in those forms. They lack accurate time correlation of variables.

Many variables, not fully understood, should be recorded to prevent loss of significant information. High speed data loggers, collecting information on a large number of variables on a frequent, periodic basis, can record that type information. They're also used in determing production costs, maintaining inventory control, and detecting abnormal conditions.

What's in the Works For Wire Rope Users

SOME new things are in the making for users of wire rope.

Here are some of the product developments of the research laboratory at Union Wire Rope Corp., a Kansas City, Mo., subsidiary of Armco Steel Corp.

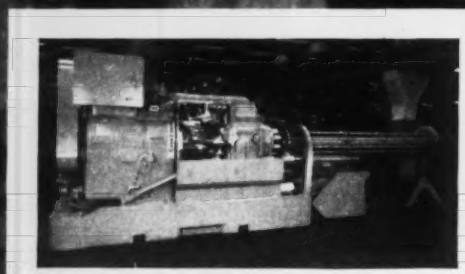
• Higher strength balanced wire ropes. High strength alone is not the answer for maximum service, the company declares. Needed are specially designed balanced ropes. Such ropes are undergoing field tests. The plan is to make them available for all uses.

• Improved plastic cores for wire rope. Union Wire Rope is working on plastic cores for wire rope for use in corrosive media. The plastic, designed to replace fiber cores, must have sufficient heat resistance and compressive strength.

• Improved lubricants for wire rope. The company is striving for better lubricants where the rope undergoes extreme pressures. Needed is an economical lubricant that has affinity for steel and gives longer rope service, both as a lubricant and as a preventive against rust.

• Better prestressing techniques. It is working to improve end anchorages for prestressed concrete so that fieldwork will be reduced.

• Several new complete lines of slings. Hand braided slings with plastic seized eyes are ready for field use. Ultraflexible slings with mechanical splices utilizing nonferrous ferrules are proving interesting to the company.



Acme-Gridley, 1¼" RB 8 producing 690 nozzle bodies per hour

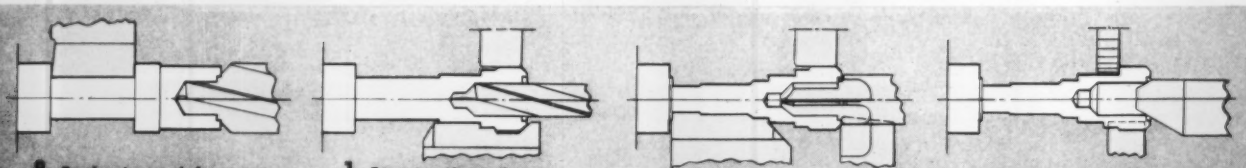
Close-up of tooling zone showing 5th, 6th and 7th positions.

ACME-GRIDLEY ELIMINATES SECONDARY OPERATIONS...

for Eagle Manufacturing Company

- Direct Cost Reduced 48%*
- Production Time Reduced 64%

* Details on request



8. Feed out—rough form rear diameter—counterbore and drill large hole part way

1. Form two front diameters and chamfer head—drill large hole remainder—support

2. Form two rear diameters—ream large hole—face end—support

3. Stop spindle rotation—mill flat—support

As a part of a continuing contribution to all phases of cost reduction, National Acme engineers initiated the development work necessary to effect important savings for this 65 year old Wellsburg, W. Virginia company.

The aluminum nozzle body of their hydraulic pump oilers formerly had been produced on a six spindle automatic and two other machines performing secondary operations. Visionary machine tool engineering made possible the application of spindle stopping and positioning on an eight-spindle Acme-Gridley to complete the entire piece *in the primary set-up . . . and increase net production.*

Advanced design and development such as this, together with wide open tooling zones, independently operated tool slides and the extreme accuracy and flexibility of direct camming . . . makes possible the solution of "unusual" jobs an "every day" occurrence at National Acme.

Write or ask one of our representatives for the complete story on the industry's most modern approach to *your* cost reduction problem.

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by the Eagle Manufacturing Company . . . an "every day" job for Acme-Gridleys.

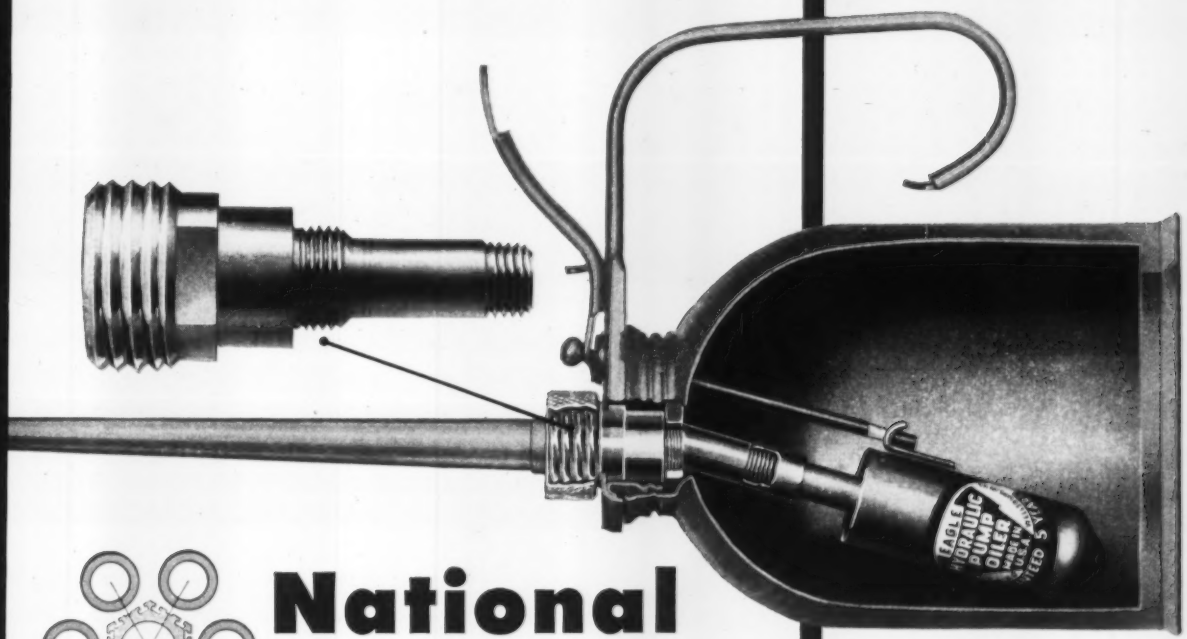
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



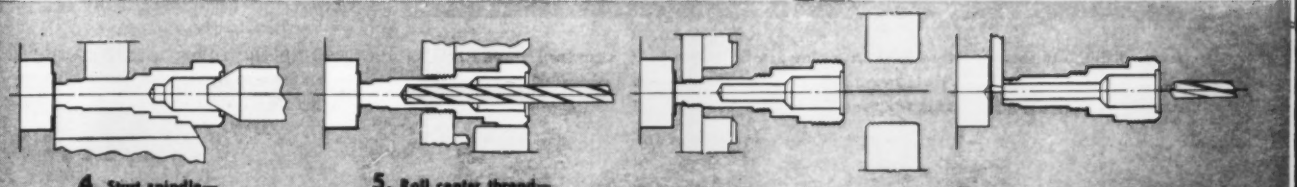
Pioneer in Circumferential Automation

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

15 Operations in 5.5 Seconds



4. Start spindle—shave all over—support

5. Roll center thread—drill small hole part way—support

6. Roll rear thread—thread head

7. Drill small hole remainder—cutoff

Tips from Missilemakers Can Cut Your Costs

1. Cutter with hula movement puts compound contours in honeycombs. Rigid fillers aren't needed.
2. Honeycomb is being brazed with a resistance electric blanket. In one case, brazing and heat treating time is down from 34 to 13½ hours
3. Chemical milling cuts weight of missile fuel tanks.

COMPOUND CONTOURS can be machined in honeycombs by a method that does not require fillers, says Martin Co., Baltimore. Both male and female compound contours can be produced.

Martin uses a standard, three axis controlled cutting machine with a newly designed portable head. A modified stylus converts the cutting to a five axis operation.

The stylus has five pickup points. Rise, fall, and tilt are transmitted to the cutter head from a wooden or plaster model.

The head can tilt ±10 degrees in two directions perpendicular to each other. The center line and the end of the cutter have a common focal point.

Tracer controls are a combination of pneumatic, hydraulic, and electronic components. Power is supplied by a 12,000 rpm air motor.

Martin's Carlton B. Jenkins is the inventor.

A modified stylus with five pickup points (left) converts a standard three axis cutting machine to five axis operation. The stylus rides the surface of the model and transmits rise, fall, and tilt motions to the cutter head

• The resistance electric blanket is being used in brazing honeycomb.

An electric blanket brazing fixture with heating elements and a cooling system has been developed. Tools hold and apply pressure to the component being brazed.

With precipitation hardening alloys, the brazing and heat treating cycle takes 13½ hours instead of the 34 hours required by conventional furnace brazing methods.

The blanket develops little heat loss and is about 65 per cent efficient vs. 10 per cent for the brazing furnace.

• Chemical milling techniques mean significant weight savings in ICBMs.

Eight aluminum panels (2014 alloy) lose 10 lb each during fuel tank manufacture. Forming usually requires sections of metal thicker than structural requirements indicate. It provides for material flow during the forming process.

Martin predicts this process will be extended to the fabrication of high strength, heat resistant steel structures.

Payoff Quick on Unit That Saves Welding Powder

A vibratory feeder and a magnetic grate can pay their way in two weeks in reclaiming hard surfacing welding powder.

Iron contaminated powder is poured into the sieve. High speed vibratory action of the feeder filters the powder through the sieve.

The feeder tray then passes the powder to the magnetic grate to separate the iron from the powder.

Reclaimed welding powder is clean and ready to use. Fine iron accumulations are periodically removed by lifting the covering grille and wiping the tubes with a cloth.

The units are made by Eriez Mfg. Co., Erie, Pa.

helping a *best seller sell!*

Superior STAINLESS STRIP STEEL

on the *high-style* model of

GM's no. 1 car—the beautiful Chevrolet Impala

Yes, every one of these 48 precisely-contoured *stainless steel* parts is used on the exterior body trim of the 1959 Chevrolet *Impala*. Here you see beauty, brilliance and strength that resist weather and wear without care for the life of the car—selling and re-selling at every turn. ● We are proud of Superior Stainless Strip Steel's applications in the fine automobiles of General Motors. Can we serve *your* stainless strip needs?

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TERNSTEDT DIVISION
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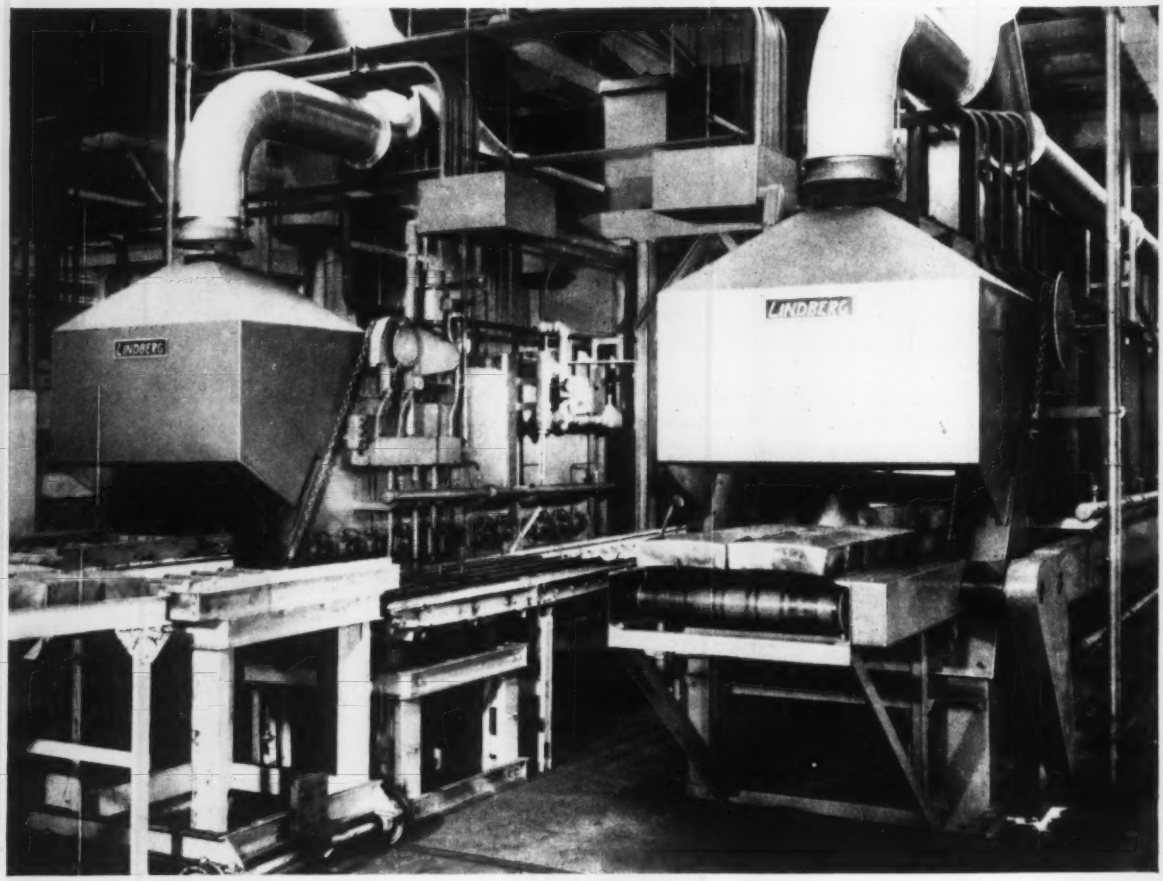
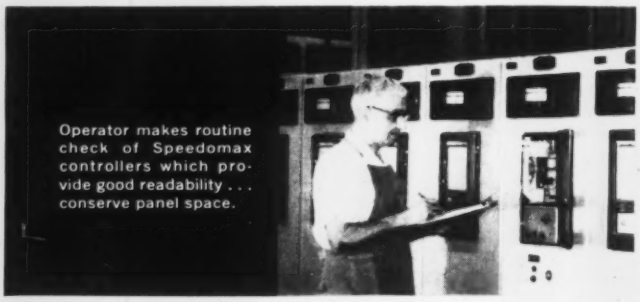
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA
For Export: Copperweld Steel International Company, New York



Automatic Electric Company: Speedomax H controllers closely regulate temperature of annealing furnaces which are completely automatic except for loading and unloading.

Control of heating and cooling temperatures a problem?

Not at Automatic Electric Company, where Speedomax® H controllers are helping to anneal magnetic properties into cores, armatures and heel pieces of quality relays and switches. These devices find wide use in telephone, industrial and military equipment . . . demand and get the best in production control. To obtain optimum magnetic properties, these components are put through a continuous 5-zone Lindberg furnace with heating and cooling temperatures closely controlled by Speedomax H. Rugged, compact and completely reliable, Speedomax H is providing the same dependable control on numerous heat treat processes . . . is helping produce both process economies and a quality product. *Whatver your heat treating process, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office or write 4957 Stenton Avenue, Philadelphia 44, Pa.



Operator makes routine check of Speedomax controllers which provide good readability . . . conserve panel space.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

Transfer System Is Fast, Flexible

This automatic system mills, drills, chamfers, and taps cast iron or aluminum cylinder heads in three sizes. It processes 38 to 44 heads an hour, and can be changed quickly from one head size or design to another. Lift and carry transfer method prevents scratching and scuffing of machined surfaces. The control system permits full speed production, using two operators, or slow speed operation, using only one.

NEED an automatic transfer and machining system, adaptable to parts of different sizes and materials? You may be interested in the Cross Transfer-matic, made by the Cross Co., Detroit.

The versatile unit machines the ends of two, three, and four cylinder heads for two cycle, in line, diesel engines. It processes cast iron heads, 12 to 24 in. long and will be adapted for aluminum parts.

• The machine combines high output with product flexibility. It can be adapted quickly to a given head size or design.

At top speed, it turns out 38 to 44 heads an hour, depending on head size and the method chosen for deep hole drilling at several stations. It face mills oil and fuel hole bosses, or water outlet pads, on three planes. It drills, chamfers, and taps all oil, fuel, and screw holes. It also air tests each head for casting density.

Two single spindle, quill type drill units chamfer oil gallery holes. Each unit is mounted on a revolving drum plate and swivels automatically from one hole to another without reorienting the part.

Fixtures and components can be repositioned to process any cylinder head in 4 hours. Tierods that connect fixtures to machine units are relocated, and machine units are advanced or withdrawn to accommodate the heads being processed. Dowel pins, inserted manually into locating holes on each side of the fixture base, hold it in position.

At several stations using single spindle drill units, air test mechanisms, or tap heads, fixtures are repositioned by a manually controlled, hydraulic cylinder. Minor changes of feed dogs and tools complete the setup.

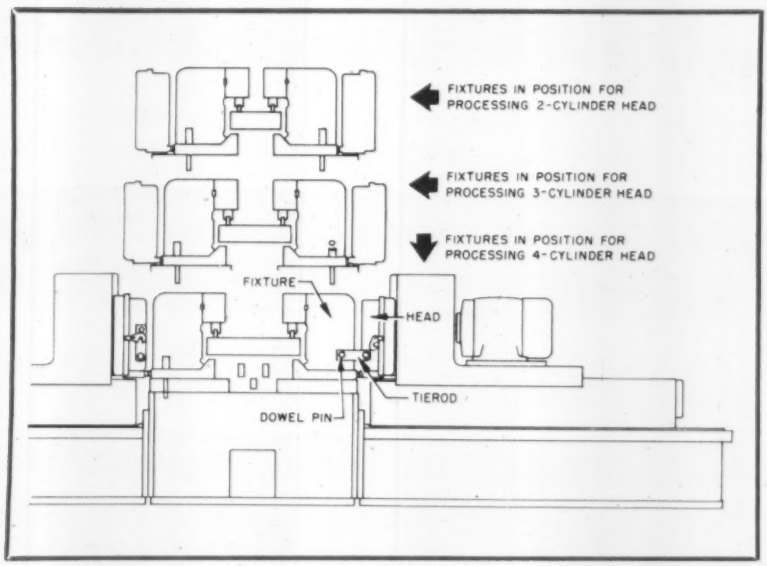
• Features incorporated in the system to machine aluminum heads are useful in processing cast iron parts.

A central chip disposal, coolant, and filtration system removes chips. Optional woodpecker drilling mechanisms remove chips in deep hole drilling and make for higher quality finishes.

A lift and carry transfer system eliminates scratching and scuffing of precision locating surfaces, usually associated with other transfer methods. It improves quality control in machining cast iron parts and will be even more important in processing aluminum ones.

• The control system permits operation at partial or full capacity and allows more economical use of manpower.

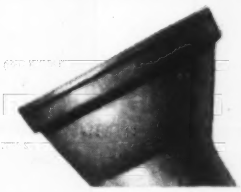
When the machine is operated at partial capacity, the operator loads parts until every station is full, switches control location to the unload station, and unloads parts until the machine is empty.



Automatic transfer and machining line processes heads for two, three, and four cylinder engines. Fixtures and components are repositioned when head size is changed

FOR THE MACHINERY PART

THAT TAKES THE BEATING



HAYNES Alloys *will do the job!*

Perfect performance for 100,000 hours at orange heat, in the combustion chambers of diesel engines, is quite an achievement. Yet it's the record of tens of thousands of special combustion cups of HASTELLOY alloy C in a well-known line of diesels.

The alloy was chosen for its unique high-temperature strength and corrosion resistance and its outstanding ability to hold heat.

These and other special properties are built into HAYNES alloys —to fit the particular needs of design and production engineers for machinery parts that must meet the roughest service conditions.

If you are designing such a part, investigate HAYNES alloys. There are more than 15 to choose from. They include HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. All parts can be furnished machined or ground to specified size and finish.

HAYNES ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

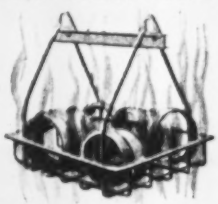
UNION CARBIDE

Address inquiries to Haynes Stellite Company, 420 Lexington Avenue, New York 17, N. Y.

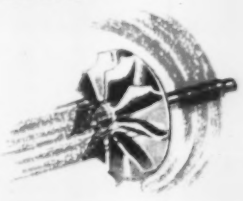
The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

TYPICAL "HAYNES" ALLOY PARTS THAT RESIST...

ABRASION. Ten times the life and still no sign of wear, is the record of this plastics-extrusion torpedo nose made of HAYNES STELLITE alloy No. 3. This is one of many HAYNES wear-resistant alloys.



CORROSION. Baskets made of HASTELLOY alloy C used for holding forgings during acid treatment, are still good after 15 months of service. Materials formerly used were replaced every month.



HIGH TEMPERATURE. Turbine wheels in the "hot" ends of diesel engine turbochargers are investment-cast of HAYNES STELLITE alloy No. 31, for service at speeds up to 50,000 rpm. at 1500 deg. F.

By C. BROWN & J. F. EINLOTH
Gearing Div., Westinghouse Electric Corp., Pittsburgh

Throwaway Cutters Save $15,596 a Year

A highly organized program at Westinghouse integrates the new tools into the plant in three months

EXPENDABLE tooling, a big item of expense in metalworking, is program controlled at Westinghouse Electric Corp.'s Gearing Div.

Analysis of our small-tool expense account showed that expenditures for brazed, single point tools and their maintenance were large. A detailed plan, simple but concise, guided the gearing division through the changeover to throwaways in less than three months. It ultimately provided the savings that were sought.

Here are the six steps used to change from brazed single point tools to throwaway inserts:

1. Determine the feasibility of changing to throwaways, from the standpoint of cost and quality of the work produced.

2. Determine the organization required to implement the program.

3. Review present cutting tool systems.

4. Determine the area where the program should be introduced.

5. Establish schedules for the program.

6. Provide controls to insure the continued success of the program.

• First step was to conduct a feasibility study that would predict the savings.

Statistical and technical data from industrial engineering, augmented by data furnished by purchasing, revealed that a saving of $0.155 per standard hour could be realized on turning. Further, it was shown that we could at least maintain our work quality.

Responsibilities were delegated. The chairman's duties included coordinating and scheduling the program, plus the task of issuing interim and final reports.

An industrial engineer was responsible for planning, cost comparisons, cost analyses, program procedure work, and final financial and program writeups.

Our tool application engineer was responsible for soliciting (through purchasing) the assistance of suppliers and for determining which machined items and facilities lent themselves to throwaways. He was also responsible for initiating all paperwork pertinent to procurement of tools, tips, and spare parts, the education of personnel, the application of tools, recording of performance, and policing of the program. His was the only full time job on the project.

• A thorough review of present systems of tool buying, stocking, use, maintenance, and disposal got the program underway.

Tentative schedules (outlining target dates for facilities to be surveyed, equipped, and followed up) were prepared.

As soon as the plan was approved, these steps were taken to get it into action:

1. Three men were selected to fill the committee jobs.

2. Venders were called in.

3. Supervisors were told about the program.

4. A test area was chosen and trial applications made.

5. Trial performance was measured and compared with estimates.

6. Steps 4 and 5 were repeated as long as applications were justified.

7. A control system for the new tooling method was established.

Numerous suppliers were contacted. The one offering the greatest application assistance (price and quality being competitive) was dealt with on an exclusive basis. This eliminated confusion and resulted in maximum use of the supplier's knowhow.

The new concept of tooling was discussed with members of supervision during the second week. The potential of the tool and the importance of a fair trial were stressed. At this meeting, the test area was selected and the introductory steps started.

Four days after the initial study, the first set of tools was put to work. Results of this and later applications were carefully observed and recorded by the tool engineer. At the completion of this project, over 200 throwaway toolholders were working effectively.

• Six months after the start of the

How It Worked

Figuring that they could replace half their carbide tools with throwaways, Westinghouse production men estimated their savings. After the new tools were in use, a cost study showed how close the estimate was.

Preliminary Estimate

(Based on 28,184 standard hours)

1. Assume all tools are brazed:

Number of tools dulled		8,275
Average standard hours per tool dulled		3.406
Cost of tools over a ten-regrind life		
Original average cost	$4.00	
Grinding labor	6.632	
Grinding wheels	1.265	
Ten-regrind cost	$11.897	
Tool cost per grind		$1.19
Tool cost per standard hour ($1.19 ÷ 3.406)		$0.3493

2. Assume half the tools are throwaways:

Cost of 4,138 brazed tools dulled at $1.19 per edge	$4,924.22
Cost of throwaway tools dulled (at an estimated cost of 20 cents per cutting edge, and allowing a tool life 150 per cent that of brazed tools because of precision grinding.)	$ 551.66
Total tool cost per standard hour	$0.1943

3. Estimated Annual Savings:

$0.155 per standard hour, at 110,000 standard hours a year	$17,050.00
Salvaged tool savings	1,030.86
Total estimated annual savings	$18,080.86

Production Record

(Oct. 6 to Dec. 29, 1957)

Cost of brazed tools per standard hour	$0.1616
Cost of throwaway tools per standard hour	0.0757
Total tool cost per standard hour	$0.2373

SAVINGS

$0.112 per standard hour, at 108,000 hours estimated for the year	$12,096.00
Salvage tool savings	1,250.00
Waiting time savings	1,300.00
Special grinding savings	950.00
Total annual savings	$15,596.00

program, a calculation of savings showed a $15,596 annual return on the three-month investment.

In addition to the cash savings in tooling costs, we found that: Our productivity was up because of the precision grinding and quick indexing; our inventory of tools was reduced because throwaway holders have a longer life than the brazed shanks, and most of the inventory is in the small tips; savings in overhead accrued from the reduced need for tool grinding capacity, as well as stores handling and forms processing.

The control, designed to insure the continued success of the program, uses a working ratio between the number of single point tools maintained and the standard hour incurred. This ratio is then compared with the predetermined control ratio figure.

Ultrasonics Weld Foil, Reduces Handling, Scrap

Ultrasonic vibrations are being used to join aluminum foil ends while the metal is traveling through the mills. The welds are neat, strong, and eliminate downtime, says Aluminum Co. of America, Pittsburgh.

One large user estimates that Alcoa's product will save his firm up to $100,000 a year by reducing handling and scrap.

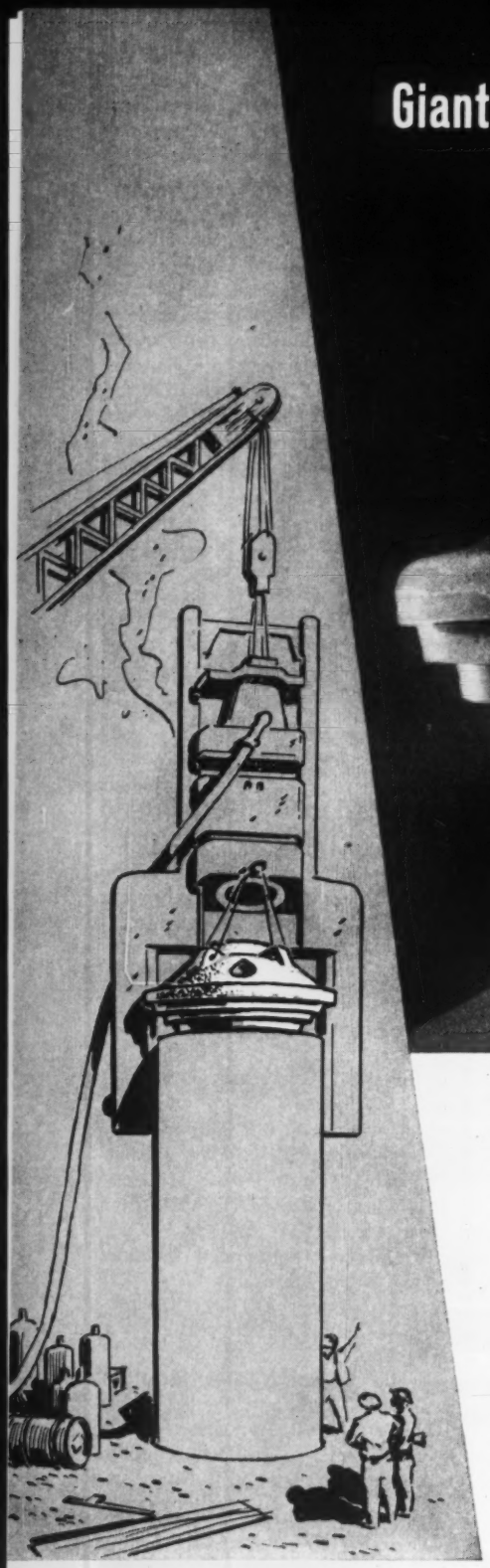
One Alcoa mill has equipment to splice foil up to 38 in. wide. Splicers soon to be installed at other locations will handle greater widths.

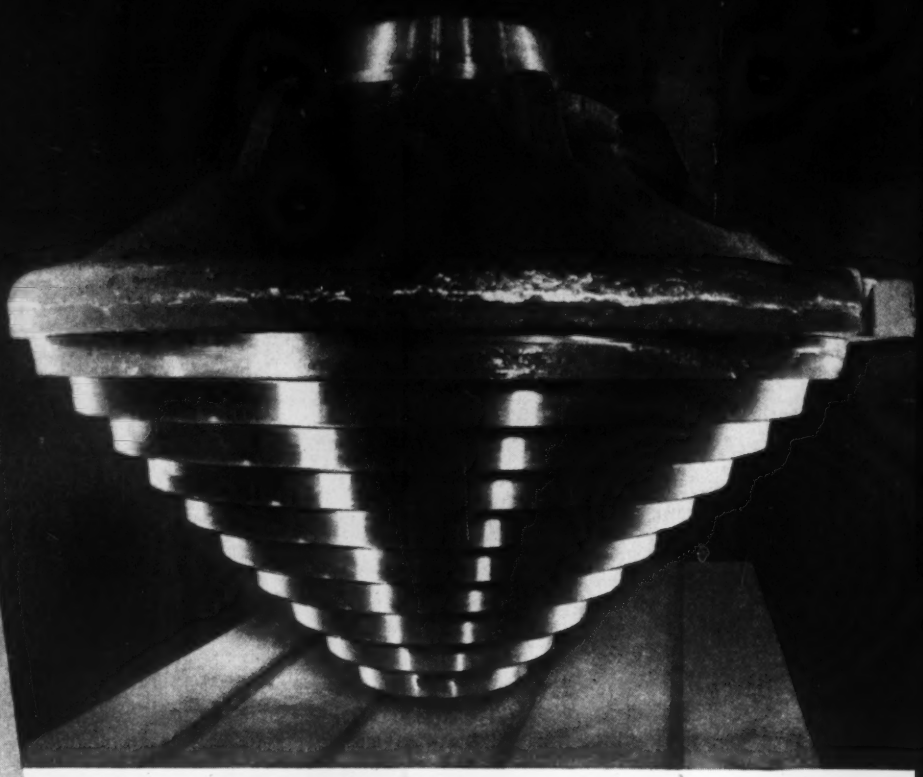
• **Method**—Foil is joined by subjecting it to vibrations of 50,000 cps. The energy fractures the natural oxide film on the foil, and a true metallurgical bond about 3/32 in. wide is formed. It is about as strong as the parent metal.

The splice will not tear adjacent layers of foil and will run smoothly through coating or printing machines. It forms an excellent moisture barrier.

The welding technique is a joint development of Alcoa and Aeroprojects Inc., West Chester, Pa. Aeroprojects markets its Sonoweld line of metal joining equipment through its subsidiary, Sonobond Corp.

Giant Cast Steel "Top" For An Oil Explorer





If this 17,540 pound cast steel pipe cap were not used to set a string of oil well casing, it could be mistaken for a gigantic spinning top. Either way, here is visual proof of the diverse requirements for industrial steel castings which are satisfied by the experienced engineers, metallurgists and skilled foundrymen of Erie Forge & Steel Corporation. From the open hearth melt through the machining operation to the shipping dock, close quality control is our prime concern.

Erie Forge & Steel for many years has been making Steel Castings for rolling mills, cement mills, blast furnaces, presses, forging hammers, power turbines, ships, oil field production equipment and heavy industrial machines.

You can depend upon us to meet your most severe steel casting and forging requirements.

ERIE FORGE & STEEL CORPORATION

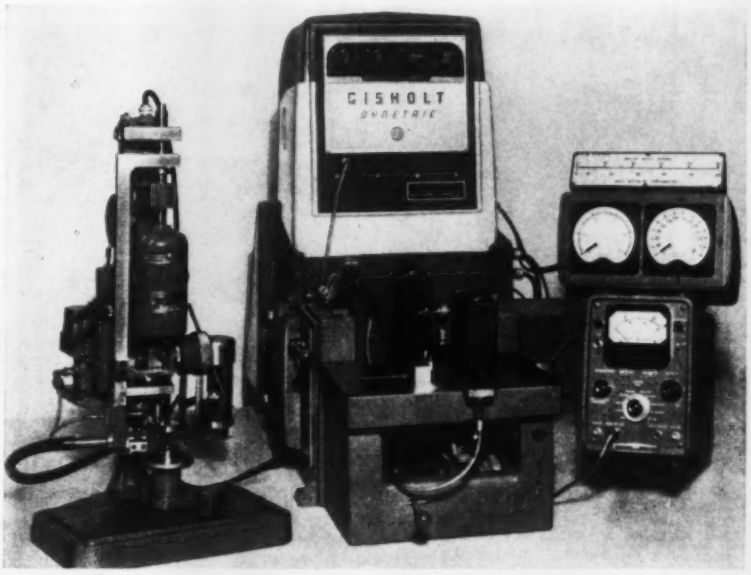
ERIE, PENNSYLVANIA

Miniature Rotating Parts Balanced Easily

VIBRATION in miniature, high speed, rotating parts or assemblies can be eliminated easily without skilled personnel by using a new Gisholt bench type balancer, which requires no special mounting. The unit handles work such as miniature armatures, aircraft and missile gyros, small spindles, turbines, and textile parts.

Unbalances causing work support movements greater than 0.000002 in., with the work rotating at any speed between 1000 and 3000 or between 4000 and 12,000 rpm, can be quickly and accurately measured and located.

Accuracy is not affected by extraneous vibrations or electromagnetic disturbances, including those set up by electrically self-driven assemblies.



The balancers are designed for fast setup over a wide work range and special tooling for any job is simple and inexpensive. Optional equipment includes special work support fixtures for air or electrically self-driven parts; a photocell unit that can replace the standard strobe lamp; and an automatic speed control package for air driven parts.

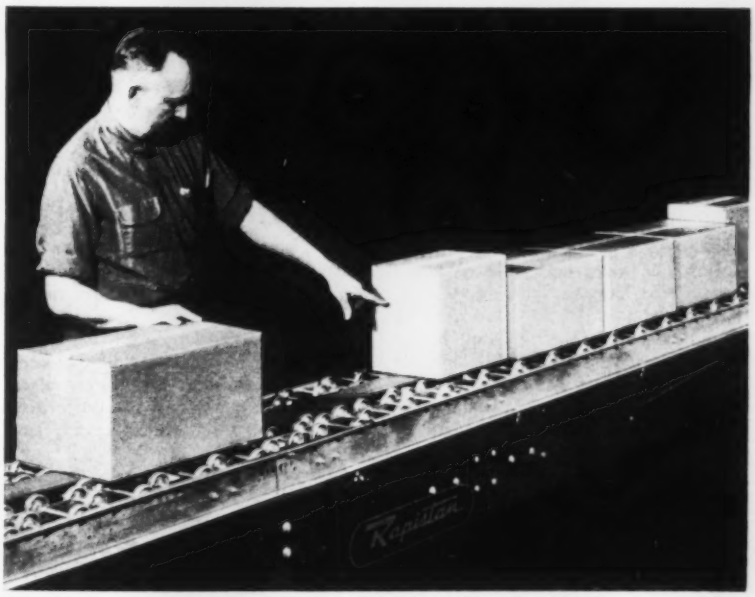
For more information, *write* Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.

Pressure Sensing Conveyor Eliminates Jackknifing

ACCUMULATED carton line pressure, slug loading and carton jackknifing are minimized by the Rapistan pressure sensing conveyor. The A-P-C unit is a wheel conveyor with a 4 in. belt replacing the center load-bearing wheels of the equipment.

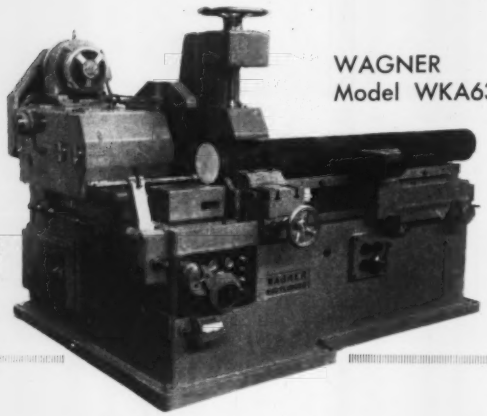
Pressure sensing characteristics of the conveyor result from an effective system of trigger wheels linked with pressure wheels. Through these wheels, optimum belt pressure is delivered to cartons of varying weight for movement. Pressure is removed from the cartons when accumulation is required.

The trigger wheels and pressure wheels combine to raise and lower the belt so that motion can be imparted when the belt is raised to come in contact with the bottom of the carton. When the pressure



48 Models of Cold Saws to Meet Your Requirements

WAGNER, WITH A COMPLETE LINE OF SEMI-AUTOMATIC, FULL AUTOMATIC, HIGH SPEED AND SPECIALIZED MODELS, COVERS THE ENTIRE FIELD FOR MODERN COLD SAWING OF MACHINEABLE METALS



WAGNER
Model WKA630

Here is a fully automatic hydraulic cold sawing machine that gives peak production continuously.

ALBERT KLINGELHOFER MACHINE TOOL CORP.

Kenilworth, New Jersey

There's a Satisfied Customer back of most orders for

Diamond Perforated Metals

Naturally, we're always glad to make new friends and open up new accounts but, more and more as time goes on, the greater part of our business comes from concerns that have dealt with us before—some of them for nearly half a century.

One Reason is because they have learned that Diamond Perforated Metal Products are always reliable and our charges in line with competition of comparable quality. Another Reason is because our facilities are so complete, and our stock of dies so extensive, that almost any demand for perforated metal sheets, plates or parts can be taken care of promptly, accurately and economically.

ALL inquiries receive prompt attention. Illustrated catalogs give helpful working data—show many modern applications—enable you to select the best pattern for any purpose.

DIAMOND MANUFACTURING CO., WYOMING (Wilkes-Barre Area) PENNA.

New Bulletin No. 47, describes DIAMONTEX Perforated Metal Lay-in Panels for Modern Acoustical Ceilings.

wheels are lowered, the belt drops away from the carton which then rests only on the gravity wheels that make up most of the bed width of the conveyor.

Accumulated cartons can be separated with fingertip pressure for removal or insertion of a single carton.

For more information, *write* Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Cutting, Grinding Fluids

A WATER emulsifiable cutting fluid and a synthetic grinding compound have been introduced by L. R. Kerns Co.

Said to be suitable for all cutting operations, the SCF-3207 oil base cutting fluid contains high percentages of extreme pressure and anti-weld additives. It will not cause dermatitis and will not turn rancid.

The Kerns SGC-6560 grinding and cutting compound has extreme pressure properties and leaves an oily film on the work. Transparent and nondrying, it produces work that appears clean, but provides good rust protection and lubrication. It will not dry out, will never cause binding, or impair operation of machines or machine parts.

For more information, *write* L. R. Kerns Co., 2659 E. 95th St., Chicago 17, Ill.

Variable Speed Drive Is Shaft Mounted

THE SHAFT mounted design of the Sterling mechanical variable speed drive is the most simplified and most efficient method of mounting, says the manufacturer. It eliminates all intermediate transmission elements, such as couplings and sprockets.

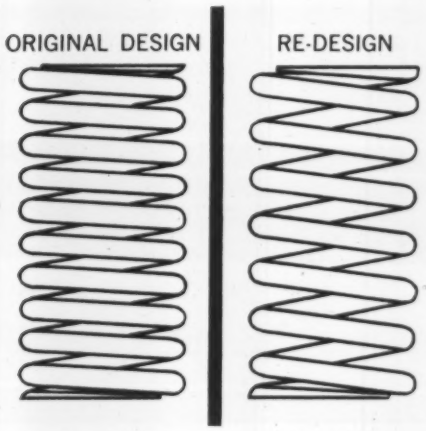
The drive has been designed for variable speed applications where space limitations dictate that the output shaft be at right angles to the transmission. It is especially adaptable to applications requiring controlled speed in a light, compact power drive.

Available in dripproof or totally

(*Please turn to Page* 172)

70 POUNDS OF SPRINGS

were just going along for the ride!



10 coils—.120″ wire
130 lbs. of wire per
1M springs

7 coils—.105″ wire
60 lbs. of wire per
1M springs

Because of mounting cost conditions, a user of motor-support springs asked for a complete design check. Redesigned by A.S.C. engineers, required stresses were met by a slight change in wire size, allowing a reduction in number of coils from 10 to 7. This meant a saving of 70 pounds of material per thousand springs. Because of the shorter length of wire, coiling and grinding speeds were increased, heat-treating time reduced. Saving to the customer—40%.

How about the springs you use? A consultation on your specifications costs you nothing. Just contact any Division of Associated Spring Corporation. For a handy reference to spring action, write for "Spring Design and Selection—in brief."

5504

Associated Spring Corporation

General Offices: Bristol, Connecticut

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B-G-R Division, Plymouth and Ann Arbor, Mich.
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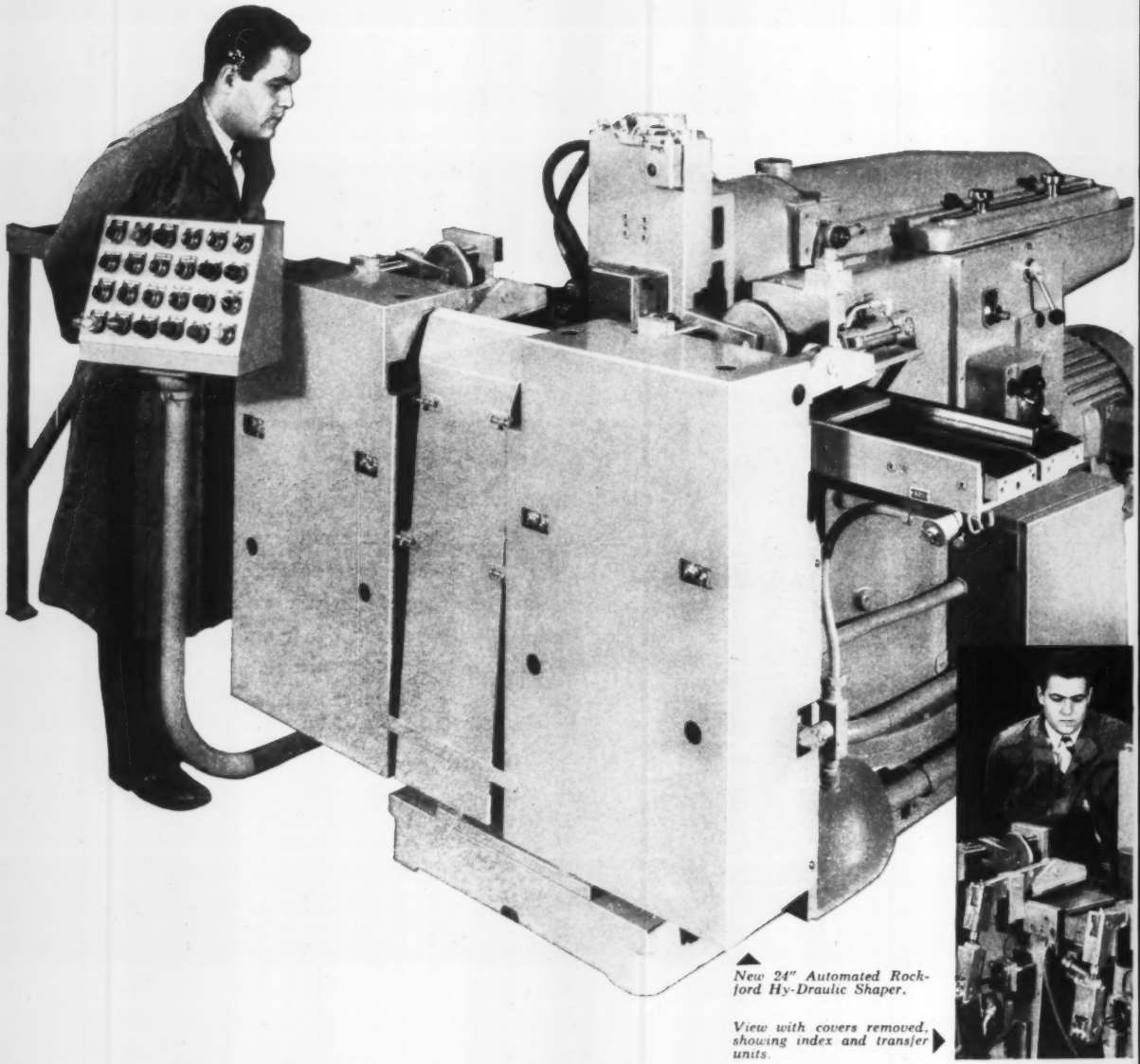
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.

Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.

Now... automation comes to shaping!

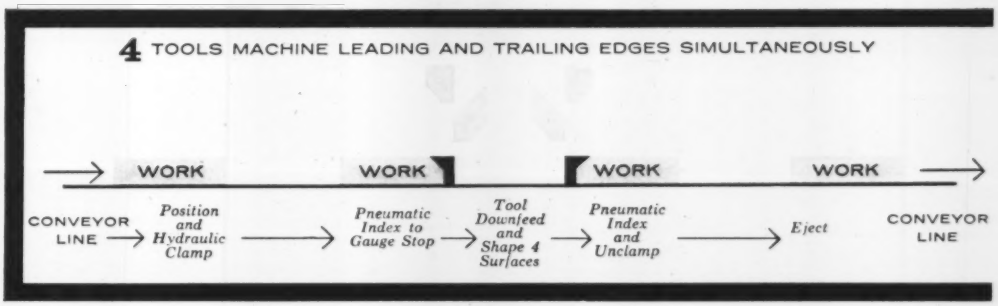


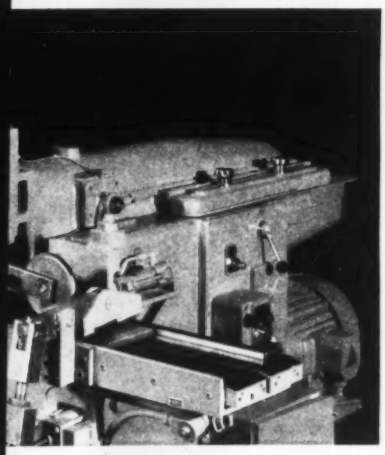
New 24" Automated Rockford Hy-Draulic Shaper.

View with covers removed, showing index and transfer units.

COMPLETE AUTOMATIC CYCLING ON ROCKFORD

HY-DRAULIC SHAPER PRODUCES CONTINUOUS FLOW OF PARTS FOR CONVEYOR-LINE PRODUCTION . . .





Believed to be the first automatic shaper built, this standard 24" shaper with special tool head and cross-rail has been adapted to conveyor-line operation by arranging completely automatic cycling, including loading and unloading.

With this new method, many types of flat plates may be machined accurately and efficiently at high production rates, saving costly cutting tools and extra fixturing expense.

Four standard high speed steel tool bits with identical grinds are used to finish one vertical and one angular surface of each of 2 pieces simultaneously, as shown in diagramatic sketch of the automatic cycle. The machine features pneumatic index, hydraulic positioning and clamping, and positive mechanical feed. Operation is continuous until machine is stopped by operator, or automatic safety devices reject the cycle sequence.

This type of automatic machining has many variations, using Rockford Hy-Draulic Shapers. If you have high output requirements for work which lends itself to this type of machining, send us blueprints for estimates and recommendations.

h
HYDRAULIC

ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

INTRODUCING...

NOW...

select from a complete range of capacities and speeds...1/8 to 2 tons and 8 to 60 fpm.

important new models of the Lodestar® electric hoist

NEW MODELS in 1/2, 1 and 2 tons

LODESTAR FEATURES INCLUDE:

- Safe, Heavy Duty Performance
- Lowest Headroom
- Push Button Control
- Fully Enclosed Components
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- Ultra-Modern Electric Braking
- CM-ALLOY Flexible Link Chain
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Request catalog and name of local stocking distributor.

LARGER CAPACITY and FASTER SPEEDS ...for speedier, lower cost materials handling

● Here's your opportunity to slash lifting and handling costs. Put these new Lodestars to work where their increased speeds and capacity match your maximum requirements. Many thousands already in service demonstrate that you, too, can benefit from more efficient handling, lowered costs and increased productivity.

CM HOISTS

CHISHOLM-MOORE HOIST DIVISION
Columbus McKinnon Chain Corporation
TONAWANDA, N.Y.
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NEW PRODUCTS and equipment

enclosed constructions, the ¼ to 3 hp units can be operated at 360 rpm to 5.2 rpm, and speed variations from 2:1 to 10:1.

For more information, *write* Sterling Electric Motors, 5401 Telegraph Rd., Los Angeles 22, Calif.

Vacuum Furnace Has Production Capacity

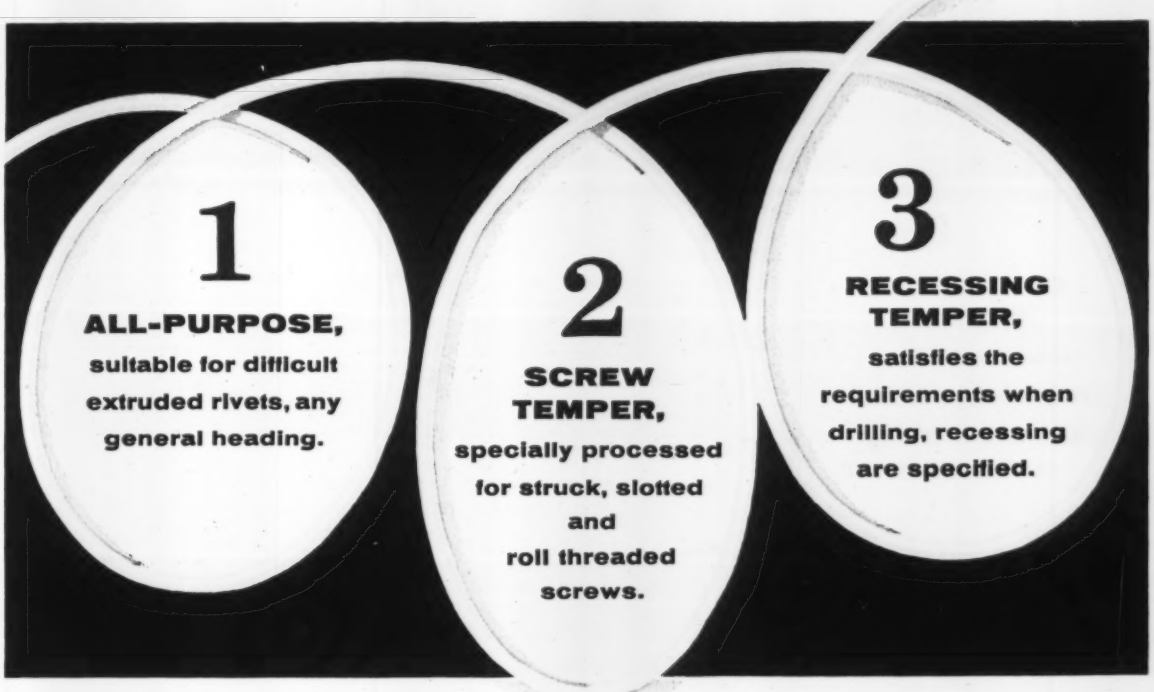
HEAT TREATING, brazing, sintering, and testing of reactive metals and ceramics in the aircraft, electronic, nuclear, and metalworking industries can be done in the Model 2915 vacuum resistance furnace.

The furnace can operate at temperatures as high as 4400° F. It can be operated under vacuum, or under inert atmospheres. An extra large heating unit provides rapid heating (about 6 minutes) and cooling (20 minutes).

The entire system is designed for fail-safe operation. Vacuum valves are air operated and interlocked, and automatically shut off in case of power failure. All valves stay closed until the operator pushes a central reset button and restarts the me-

TRI-TEMP

means you can get ALL 3 TEMPERS in BRISTOL Extruded Heading Wire



Bristol offers three special tempers in cold heading wire and all of these tempers possess uniform flow characteristics.

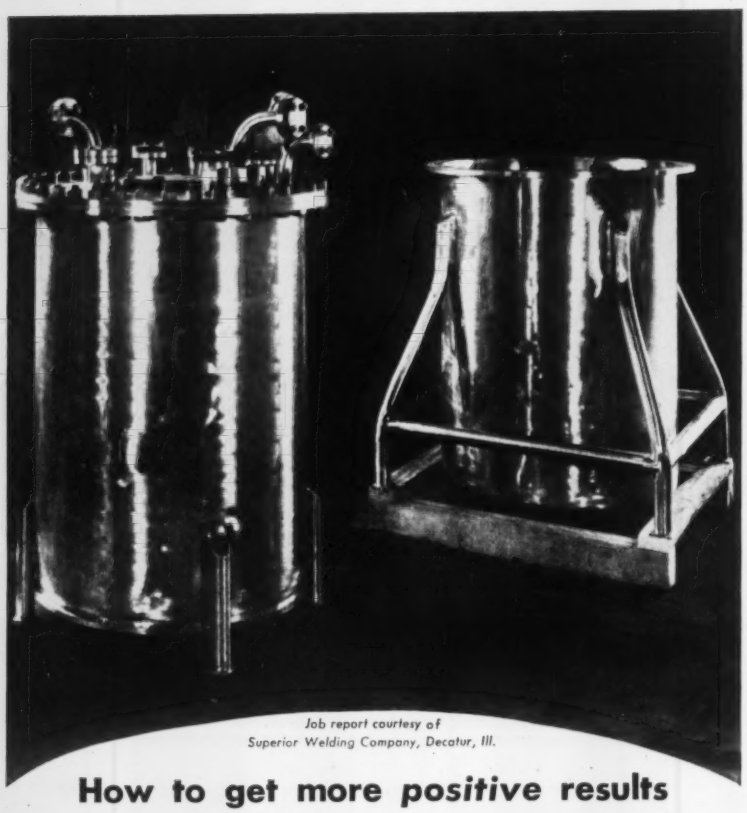
What's more, you can get them in any of these five alloys: 87-13 . . . 90-10 . . . 85-15 . . . 70-30 . . . 65-35 . . . as well as in nickel silver and silicon bronze.

What are *your* requirements?
Just call LUdlow 2-3161.

The **BRISTOL BRASS CORPORATION**

Since 1850, makers of Brass strip, rod and wire in Bristol, Connecticut
Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse

AND FOR BRASS FORGINGS, TOO . . . ACCURATE BRASS CORP. (SUBSIDIARY OF THE BRISTOL BRASS CORP.), BRISTOL, CONNECTICUT.



Job report courtesy of
Superior Welding Company, Decatur, Ill.

How to get more *positive* results when Welding Stainless

WELD WITH ARCOS

STAINLESS ELECTRODES

These vessels—used for processing a chemical where utmost product cleanliness is required—were made of 304 ELC Stainless Plate and welded with Arcos Chromend 19-9 CB (347) electrodes. The fabricator selected these electrodes for the "right" analysis to resist corrosion and to assure a surface, including the weld areas that would take a high polish both on the inside and outside to make thorough cleaning easy. It's proof again that whatever the job demands Arcos quality weld metal will meet all the required tests. ARCOS CORPORATION, 1500 South 50th St., Phila. 43, Pa.

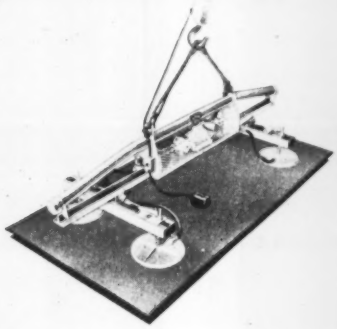
chanical pump. Furnace heat and diffusion pump heat are cut off if water fails.

For more information, *write* NRC Equipment Corp., 160 Charlemont St., Newton 61, Mass.

Vacuum Lifter Automates Plate-Sheet Handling

SHEET and plate steel weighing up to 4000 lb can be handled easily with a self-contained vacuum grapple.

The unit consists of a tubular strong back which also acts as a vacuum reservoir, an integral vacuum pump and motor, and rotatable cup arms which are adjustable longitudinally to accommodate various sheet or plate lengths. Each of the two arms carries two vacuum cups.



Interlocked controls provide a safe-to-lift light to indicate adequate vacuum. Instant release is accomplished by means of a push-button operated solenoid valve which cuts off the vacuum supply and uses the vacuum pump exhaust to blow the plate or sheet loose.

For more information, *write* Noble Co., 1860 Seventh St., Oakland, Calif.

Air Device Detects Missing, Broken Drills

FOR USE with multiple or single station automatic tooling machines, the Sheffield drill detector spots broken and missing drills before damage can be done and supplies

a signal for machine shutdown.

It is unaffected by dirt or coolant. The continuous jet of air blowing against the drill helps to keep the drill clean and free of chips. The unit can also be used to detect broken reamers, taps, and other types of tools.

The unit detects the presence or absence of a drill or similar tools by means of a stream of air flowing against each drill as the drill enters or is rejected from the workpiece. The broken or missing drill causes a pressure drop in the pneumatic circuit which initiates an electrical impulse to operate signal lights and relays.

For more information, *write* Autometrology Div., Sheffield Corp., Dayton 1, Ohio.

Twin Mandrel Seamer Has Automatic Welding Head

CONTINUOUS arc, maximum production, and operational utility of one automatic welding head and power source are accomplished in a line of opposed double mandreled seamers. Both holding and clamping mandrels utilize the same welding head.

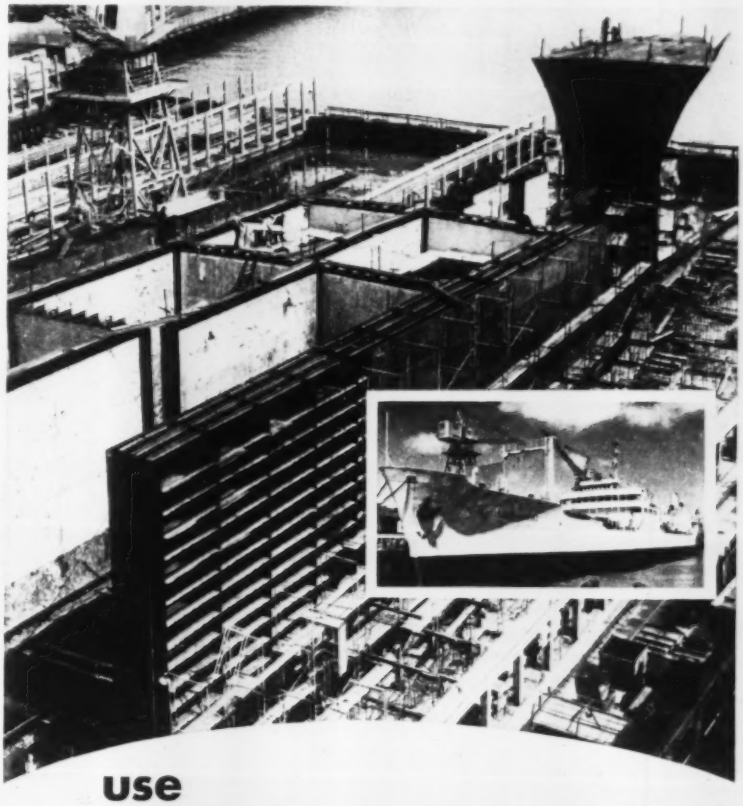
While the welding cycle is taking place on one side of the fixture, the next piece to be welded is being loaded on the opposite side. Production loss due to normal downtime for loading and unloading is eliminated.

For more information, *write* Pandjiris Weldment Co., 5151 Northrup Ave., St. Louis 10, Mo.

Ultrasonic Cleaning Tank

THE LARGE capacity, Blackstone ultrasonic cleaning tank has a highly efficient transducer that is air cooled and designed to radiate heat. In continuous operation, it will not

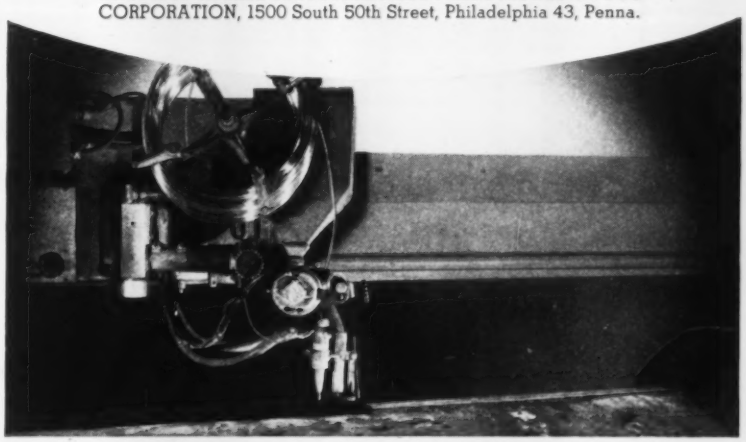
When submerged arc welding requirements are HIGHLY UNUSUAL!



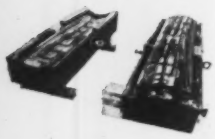
use

ARCOSITE BONDED FLUX

The SS Angelo Petri—the first of its kind—is a new wine tanker carrying 26 welded cargo tanks with a 2 million gallon bulk capacity. Especially unusual was the use of submerged arc welding on both sides of the type 316 stainless-clad steel tanks. ARCOSITE C-17 FLUX and Arcos CHROMENAR 25/20 bare wire were used to assure proper physical, corrosion resistant properties, and joint soundness. To control dilution on the stainless side, the clad side was automatically gouged slightly by carbon arc. Write today for information on ARCOSITE BONDED FLUXES and ARCOS STAINLESS and NICKEL ALLOY ELECTRODES. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Penna.



TOOL FABRICATORS



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QUALITY CONTROLLED FORMULATIONS

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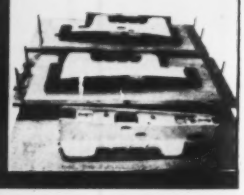

Registered trade names:

- EPOCAST
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MACHINISTS

COWLES
ROTARY KNIVES

Complete line. We can furnish knives of correct analysis, including carbide, to slit any ferrous or non-ferrous material. For quick, accurate set-up and clean, sharp cuts, specify "Cowles", world's largest manufacturer of Rotary Slitting Knives.

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Write for New, Fully Illustrated Bul. No. 571 Today.

NEW PRODUCTS and equipment

overheat low flash, flammable, or toxic solvents.

Four multiple element transducers constructed from more than a thousand separate magnetostrictive strips operating at 20 kilocycles a second operate the tank. The high thermal stability of the nickel elements from which the transducer is constructed makes it possible to use solvents at temperatures up to 400° F.

For more information, *write* Blackstone Corp., Jamestown, N. Y.

Additive Stops Spotting

SPOTTING and subsequent corrosion of all metals can be prevented with Entek 45.

It is a liquid additive for hot water rinses.

The product causes rinse water to shed rapidly from the metal surface, resulting in faster drying and spotless surfaces. At the same time, it leaves a strongly adsorbed, invisible film on the metal surface which protects it from tarnishing and corrosion for months.

Entek 45 may be used effectively after plating, pickling, or chemical processing of any kind.

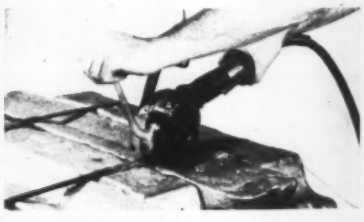
For more information, *write* Enthone Inc., subsidiary of American Smelting & Refining Co., New Haven, Conn.

Strapper Feeds from Coil

USING heavy duty steel strapping directly from the coil, the BIR stretcher eliminates waste, has a high speed take-up, and provides high residual tension.

The unit combines air powered tensioning and manual cutting in one tool.

The stretcher is said to be light, easy to thread, and convenient to operate. Predetermined tension is

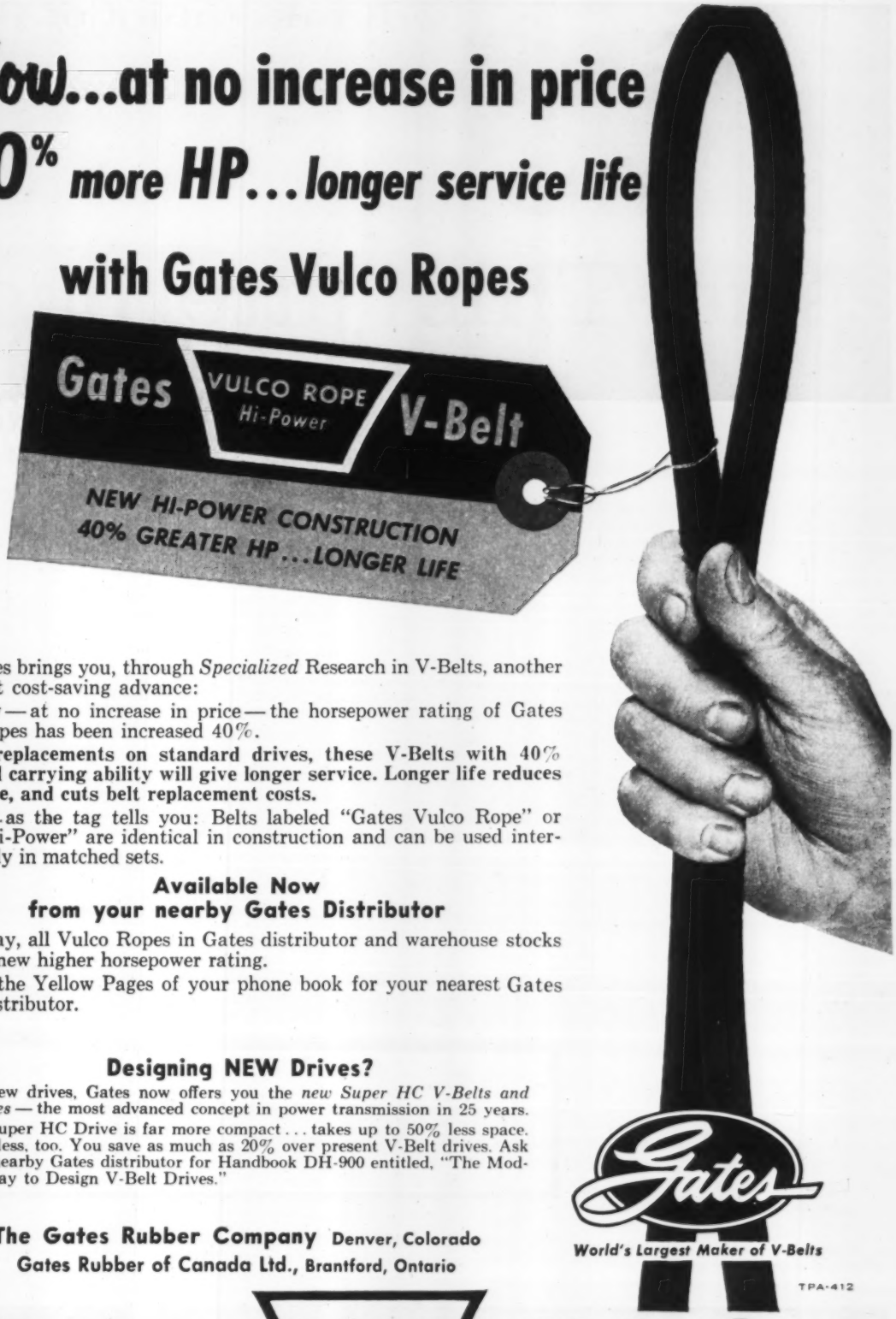


(*Please turn to Page* 180)

Now...at no increase in price

40% more HP...longer service life

with Gates Vulco Ropes



Gates brings you, through *Specialized* Research in V-Belts, another important cost-saving advance:

Now — at no increase in price — the horsepower rating of Gates Vulco Ropes has been increased 40%.

As replacements on standard drives, these V-Belts with 40% more load carrying ability will give longer service. Longer life reduces down-time, and cuts belt replacement costs.

And as the tag tells you: Belts labeled "Gates Vulco Rope" or "Gates Hi-Power" are identical in construction and can be used interchangeably in matched sets.

Available Now from your nearby Gates Distributor

Today, all Vulco Ropes in Gates distributor and warehouse stocks have the new higher horsepower rating.

See the Yellow Pages of your phone book for your nearest Gates V-Belt distributor.

Designing NEW Drives?

For new drives, Gates now offers you the *new Super HC V-Belts and Sheaves* — the most advanced concept in power transmission in 25 years. The Super HC Drive is far more compact . . . takes up to 50% less space. Costs less, too. You save as much as 20% over present V-Belt drives. Ask your nearby Gates distributor for Handbook DH-900 entitled, "The Modern Way to Design V-Belt Drives."

The Gates Rubber Company Denver, Colorado
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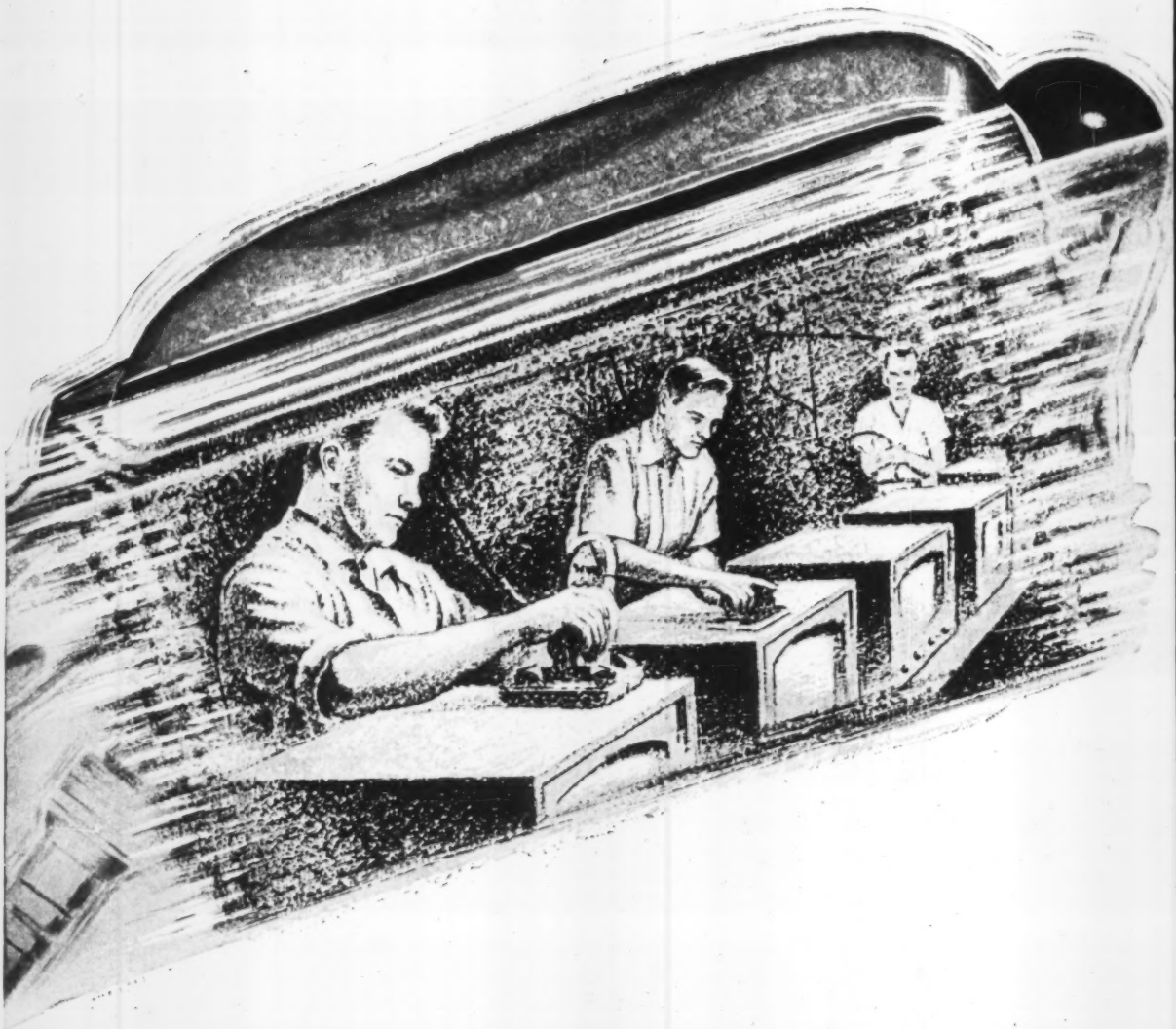
Gates
World's Largest Maker of V-Belts

TPA-412

Gates VULCO ROPE Hi-Power V-Belts

It takes a lot of Grit

This "jitterbug"



to keep industry growing

performs in factories

Orbital sanding machines are widely used in furniture factories, by metal fabricators, and in automotive shops – wherever product surfaces are slick finished or polished.

The combination of motion and the cutting action of the coated abrasive produces the satin finish on fine furniture . . the glisten and sparkle on your automobile or toaster. And American ingenuity continues to put the "jitterbug" to work on many odd tasks – from smoothing taped wallboard joints to removing paint.

Product and methods research has brought leadership in coated abrasives to Behr-Manning – and it has brought increased production and lower costs to industry and their customers. That is why Behr-Manning supplies an extraordinary variety of coated abrasives tailored to fit practically every standard machine and need – for industry and the home craftsmen.

In one year, Behr-Manning makes more than 180,000,000 sheets of sandpaper and over 20,000,000 abrasive belts – plus millions of discs, rolls, and other coated abrasive specialties.

The sign of the Bear means a better product . . . and better production

BEHR-MANNING CO.

TROY, NEW YORK – A DIVISION OF NORTON COMPANY

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals
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NORTON® ABRASIVES

HARPER®

Pouring silicon bronze at The H M Harper Company, Metals Division

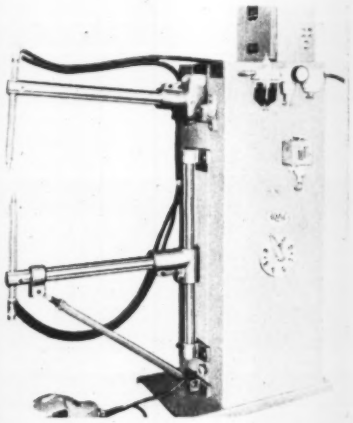
applied by pressing the throttle, reducing operator fatigue. The tools are available for ¾ in. and 1¼ in. steel strapping.

For more information, *write* Acme Steel Co., 135th Street and Perry Avenue, Chicago 27, Ill.

Rocker Arm Type Welder

FEATURES of the Alphil rocker arm welder include a heavy duty heat selector with a full load capacity, an extra heavy rear switch rod, standard electrode holders, and Morse tapers.

Available in capacities from 7½ to 75 kva, the units are completely water cooled. The standard model has a maximum spacing of 12 in. between the arms. Special models



are available for 48 in. throat depth and adjustable lower swivel arm with a maximum spacing of 28 in. between the arms.

Timer and contactor are optional features, and modifications in arm length and swivel drop can be made as required.

For more information, *write* Alphil Spot Welder Mfg. Corp., 1058 Pacific St., Brooklyn 38, N. Y.

Radial Drills Have Wide Range, Capacity

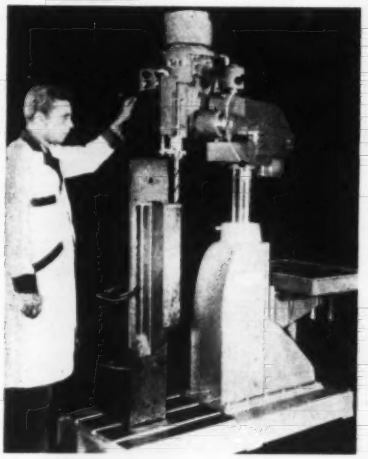
YOU CAN swing a workpiece more than 4 ft high and 5 ft in diameter under the Johansson 1, 2, and 3 hp radial drills.

By rotating the ram, either of

two work stations can be used. The rear work platform is for handling tall pieces.

Shorter parts can be handled on an adjustable table at the front of the machine.

The sliding radial arm can be moved to within 5 in. of the column or out to drill to the center



of a 5 ft circle. Automatic locks and power elevation allow the drill heads to be locked in any position radially and horizontally.

A direct gear drive provides eight spindle speeds, ranging from 60 to 2400 rpm.

For more information, *write* I. O. Johansson Co., Skokie, Ill.

Electric Clutch-Sheave Fits Standard Motors

EQUIPMENT builders and industrial users now can get the advantage of electric no-load starting without the cost usually incurred to adapt standard electric clutches to primary shafts. The Electro-Sheave, a combined electric clutch and sheave assembly, installs directly on all standard NEMA electric motor-shafts.

The units engage or release at any speed.

If inching or jogging is desired, several starts are possible in less than one revolution of the clutch without what is considered normal wear and tear on motors, controls, or machinery.

Release is instantaneous and the load is braked without plugging the motor.

The clutch, ball-bearing sheave,

HARPER®

Corrosion-resistance starts here

ARE YOU FASTENING CORROSION INTO YOUR PRODUCT?

Have you ever stopped to think about the important job your fastenings must do? They must "hold it together"—whether you apply them in production or in maintenance. More than any other component—your fastenings should be corrosion-resistant to resist the extremes in heat, fumes, chemicals, moisture and weathering.

It is here that HARPER'S thirty-five years specialized experience in corrosion-resistant fastenings can serve you. HARPER produces its own metals in its Metals Division. Stainless Steels, Silicon Bronze, Naval Bronze, Brass, Copper, Aluminum and Titanium are cold and hot-headed into standard and non-standard EVERLASTING FASTENINGS in its Bolt Division. For you, HARPER maintains the broadest standard product line in the industry—plus the facilities and "know-how" to produce your custom sizes and shapes.

Corrosion-resistance is our business—it is not a by-product or an after-thought. Be sure— specify HARPER EVERLASTING FASTENINGS in the size, shape and metal you need.

HARPER DISTRIBUTORS everywhere maintain complete stocks for immediate delivery. See your Yellow Pages.

THE H. M. HARPER COMPANY

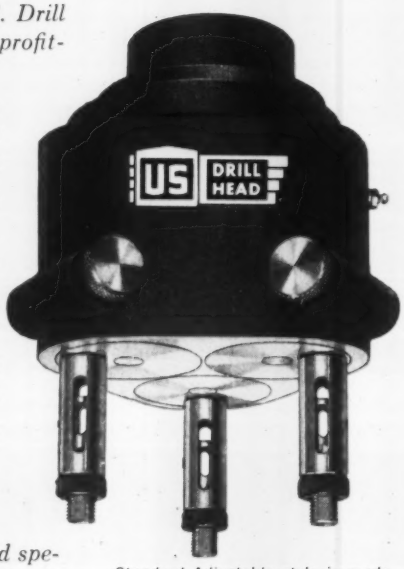
8200 LEHIGH AVENUE • MORTON GROVE, ILLINOIS

Q. Are you drilling holes in your MONEY POCKET?

A. *NOT* when you use *U.S. DRILL HEADS!*

That's because Adjustable U. S. Drill Heads are designed and built for profit-making performance!

Positive all-gear drive . . . Shaved gears for smooth, quiet operation . . . High factor of safety in design for greater reliability . . . Anti-friction bearing mounting of shafts and spindles for permanent alignment . . . Double Duty tools—when your drilling machine has a reversing spindle, you can drill and tap the same hole pattern with one head.



Standard Adjustable style is made in 5 models—58 sizes. A rugged head ideally suited for high production and flexibility.

Write for Catalog AD-57. Or, send specifications of your requirements. No obligation, of course.

US DRILL HEAD

Adjustable and Fixed Center Multiple Drilling Heads.
Individual Lead Screw Multiple Tapping Heads.

UNITED STATES DRILL HEAD CO.

BURNS STREET • CINCINNATI 4, OHIO

NEW PRODUCTS and equipment

and shaft extension sleeve all fit as a single package onto motorshafts. Actuation of the clutch field attracts and locks the armature, which picks up motor rotation and transmits it to the pulley. When the clutch is disengaged, the sheave runs freely on antifriction bearings.

For more information, *write* Warner Electric Brake & Clutch Co., Beloit, Wis.

Low Headroom Hoist

LOW HEADROOM requirements can be met with the Robbins & Myers Type F3 electric hoists, available in capacities from 1½ through 7½ tons. (Example: The 5-ton model requires only 24 in.)

Each hoist is powered by a 7½ hp, 30 minute, 55° C rise, totally enclosed motor with weatherproof brake.

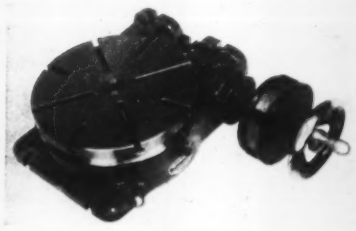
Extra large diameter cable drums permit increased lift and reduce the effect of bending fatigue in the hoisting cable. A four-position, weight operated limit switch protects both the hoist and the operator. When the hook block reaches maximum safe height, the motor is automatically reversed, lowering the lock to a safe position.

For more information, *write* Hoist & Crane Div., Robbins & Myers Inc., Springfield, Ohio.

Rotary Table Provides Precise Angular Spacing

PRECISE angular spacing is assured with an 11-in. rotary table (Model 2) which reads to 1 second and has an over-all performance accuracy of ±2 seconds throughout the entire 360 degrees.

Accuracy is achieved through the



ANOTHER NEW USE
FOR BYERS
AMBALLOY STEEL

AMBALLOY TAKES ON TOUGHEST TERRAINS

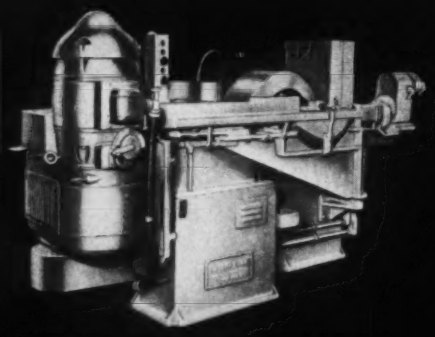
Gorging this sod-buster's mouth is a test for scraper blade durability. High-strength Amballoy passes this punishing test with excellent resistance to abrasion, corrosion, shock and fatigue stress.

From scraper blades to landing gear mechanisms—wherever the service is severe—steel users are switching to Amballoy to satisfy tough specs. Manufacturers of powerful earth moving equipment have to be keen judges of quality materials. Careful metal selection for vital parts is a must. That's why Amballoy's high strength and abrasion resistance get such important consideration for this punishing service. And Byers' ability to roll exacting, intricately shaped sections to demanding scraper blade requirements opens up additional areas of product improvement.

Amballoy's range of applications is broad. The Byers metallurgist can match the special qualities of our electric furnace steels to your critical parts requirements. He *knows* his metals. Why not call him? Contact: A. M. Byers Company, Clark Building, Pittsburgh 22, Pa.

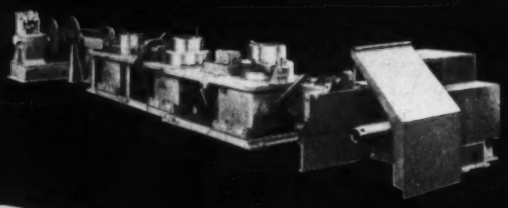
personalized quality steels from a technically competent source

A. M. BYERS COMPANY



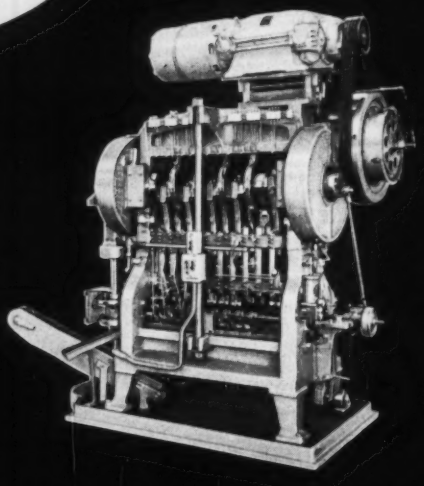
COLD HEADING
MACHINERY

EYELET, SLITTER
& WIRE
MACHINERY

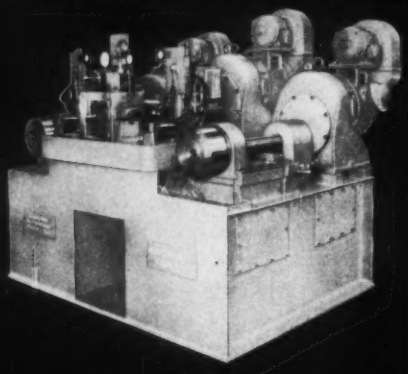


WATERBURY
MACHINERY BUILDERS
FARREL

POWER
PRESSES



ROLLING MILL
MACHINERY



THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut • U.S.A.
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

use of a nondisengageable, thread-ground worm in combination with accurately spaced teeth of its mating gear.

Accurate in either horizontal or vertical position, the rotary table is ideal for precision spacing applications on jig borers and jig grinders. An additional vernier permits normal reading even in the vertical position. The table can be used in conjunction with its companion unit, the Model 2 Sine Plate.

For more information, *write* Moore Special Tool Co. Inc., 800 Union Ave., Bridgeport 7, Conn.

Machine Coats Structurals

APPLYING mill type protective coatings (pigmented and unpigmented) on pipes, tubes, bars, angles, and other structural shapes is simplified with the cone spray coater.

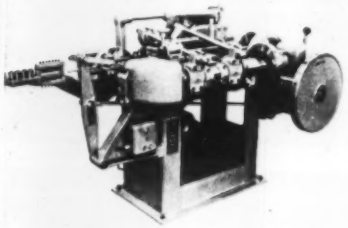
Heat and pressure, not air, atomize the coating. A timed spray cycle and synchronously adjustable spray heads reduce overspray to the point where direct recirculation to the feed system is not required.

No circulation means no loss of solvent, no premature oxidation of coating material, and no contamination of feed system by mill scale and dirt. Solvent is never added to adjust viscosity and the machine doesn't have to be flushed out after using.

For more information, *write* the Cleanola Co., 1116 William Flinn Highway, Glenshaw, Pa.

4-Slide Machine Has Space Saving Design

FLOOR SPACE requirement for the No. S-1-F combination press and 4-slide forming machine is only 53 by 57 in., a reduction of more



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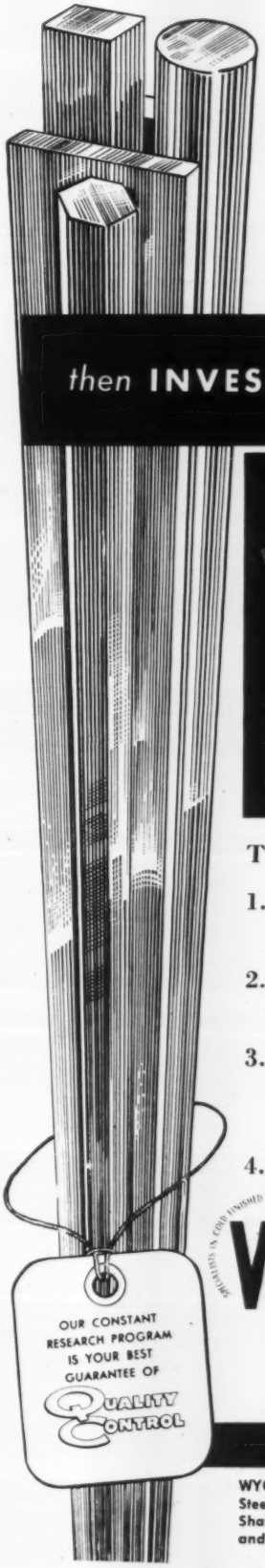

Want
Positive Uniformity
in your **COLD FINISHED STEELS?**

then **INVESTIGATE**

WYCKOFF
CARBON CORRECTED
STEELS

THEY PROVIDE:

1. **Predetermined and uniform microstructure**
2. **Excellent machinability for the grade**
3. **Can be induction hardened to full hardness without metal removal**
4. **Optimum fatigue resistance**

SPECIALISTS IN COLD FINISHED STEEL FOR OVER 50 YEARS

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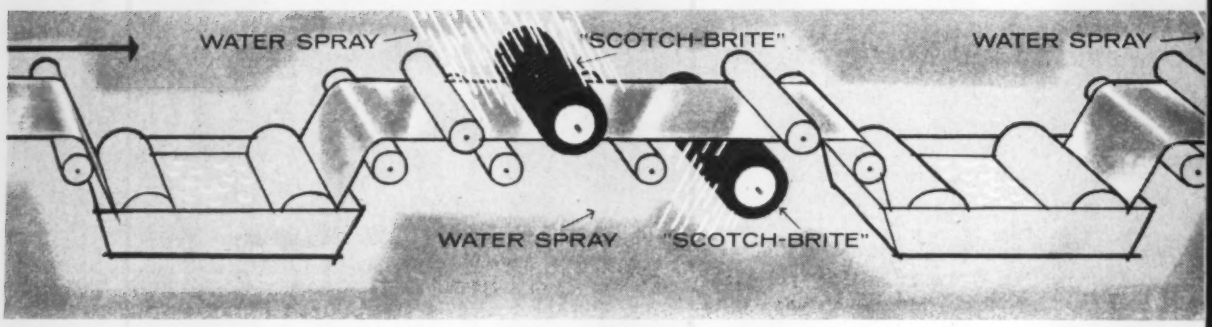
WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

NEW from 3M...

REG. U.S. PAT. OFF.

"SCOTCH-BRITE" BRAND Finishing Material



Upgrades finishes at low cost—

"Scotch-Brite" Brand Finishing Material is a newly developed Nylon web, impregnated with microscopic working materials—*completely unlike any other finishing material you have ever seen.* It is lightweight, flexible, and available in a range of sizes in sheet, roll and section forms. It can be used in any metal cleaning or finishing operation to obtain finer end finishes with greater surface uniformity. (Another similar product in the "Scotch-Brite" family, introduced in February 1958, has already revolutionized floor maintenance through its ability to *slash costs.*)

STEEL PICKLING: Diagram shows how a wide loading of "Scotch-Brite" replaces ordinary scrubbing brushes. Its superior action cleans more effectively and breaks up scale to speed the pickling process; makes possible a *far better* finish with a shorter time cycle or less acid.

FINISHING LINES: Used in production operations for final finishing on any metal, "Scotch-Brite" can upgrade final product quality and appearance by providing a perfectly uniform satin-type finish—at *very low cost.* It enables fabricators to match perfectly a mill finish applied with "Scotch-Brite", or to apply their own satin finish over any mill-supplied finish. And "Scotch-Brite" finishes cool, never discolors, *never distorts.*

You are equipped to use "Scotch-Brite" now! Material is approximately ¼" thick, may be purchased ready-cut or in sheet form for wide-shaft and other existing equipment applications. Five to eight sections

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

on any metal

of material make up one inch of wheel width. Because of its lightness, only ¼ hp per inch of wheel width is needed to drive. Greatest effectiveness is achieved with very light pressure—the material does the work.

Ask for
FREE DEMONSTRATION

New "SCOTCH-BRITE" Material is so totally different from any other finishing material, and the results are also so different, that the only way to really judge it is by seeing it in action on your own line. We'll be glad to arrange a demonstration at your convenience. Just clip and mail the coupon.

"SCOTCH-BRITE" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.
EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO.

MINNESOTA MINING AND MANUFACTURING CO.,
Dept. XW-59
900 Bush Ave., St. Paul 6, Minn.

☐ Please call to arrange a demonstration of your new "SCOTCH-BRITE" Finishing Material.

☐ Please send free booklet and descriptive material.

NAME_____

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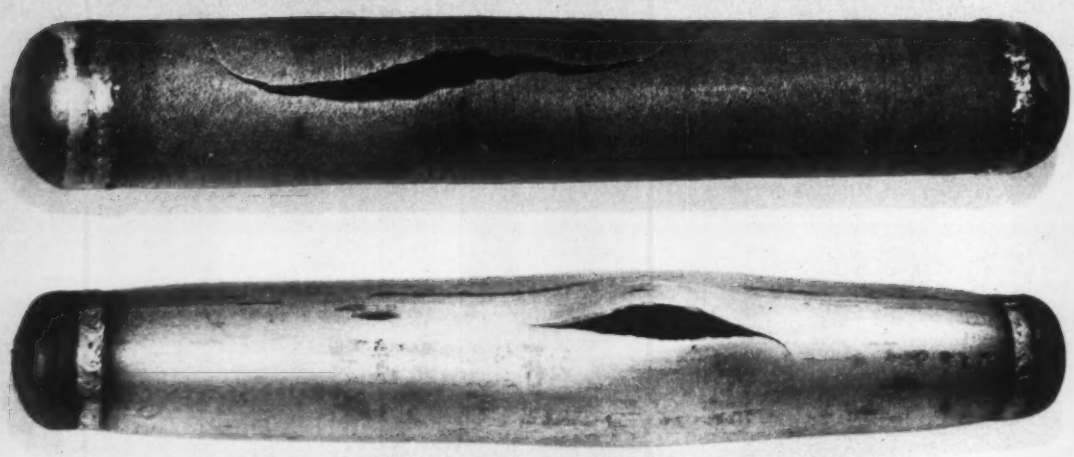
Centrifugally cast Thermalloy tube burst at 77,500 psi



Wrought tube burst at 70,100 psi

Burst tests prove 7,400 psi superiority of centrifugally cast Thermalloy® tubes

Hydrostatic pressure tests by Electro-Alloys established the rupture of a centrifugally cast Thermalloy tube section at 77,500 psi. Under the same conditions, wrought tubes of comparable section and analysis burst at 70,100 psi. These tests were conducted at room temperatures. Tensile tests show this strength margin increases substantially at the higher operating temperatures (1200°-2200° F). The Thermalloy tube was tested *as cast* —without machining the inside or outside diameter.

Thermalloy is a group of heat-resistant alloys developed for use in the range of 1200°-2200° F. The greater strength of the Thermalloy centrifugally cast tubes makes them ideal for use in radiant tubes, retorts, rolls or other heat-resistant designs employing tubes. For further data, call your representative, or write Electro-Alloys Division, 1025 Taylor St., Elyria, Ohio.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION • Elyria, Ohio

than 1000 sq in., compared with the previous model.

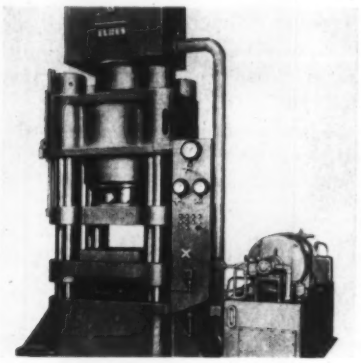
Designed primarily to stamp and form ribbon metal in one operation, the machine will also form wire with a maximum feed length of 8 in. It can handle wire up to 3/32 in. in diameter and ribbon metal up to 1¼ in. wide. The machine is mounted on a welded steel pedestal base for maximum strength and rigidity. To achieve minimum floor space, the variable speed motor drive is positioned directly in back of the machine, instead of on the end.

For more information, *write* A. H. Nilson Machine Co., 600 Bridgeport Ave., Shelton, Conn.

Special Press Coins Sintered Metal Contacts

THE PRIMARY purpose of the Elmes 1000-ton hydraulic coining press is single-action coining of sintered metallic compounds which require extremely high unit pressures.

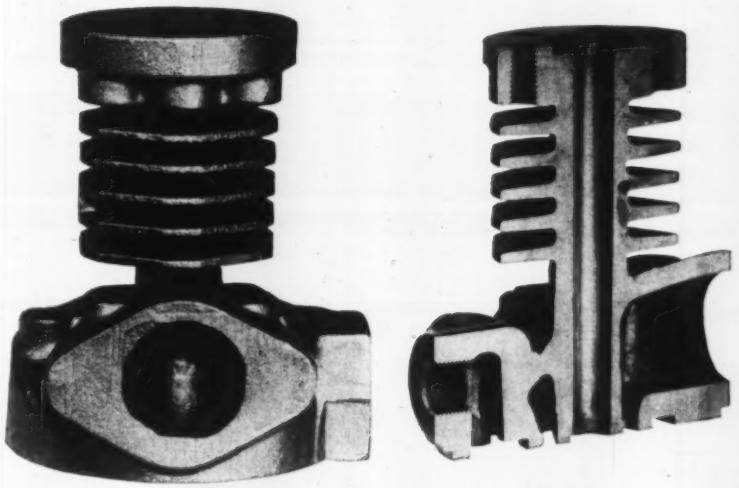
An intermediate moving platen (die holder) is used to provide straight-through ejection of the coined contact. The intermediate



platen can be adapted to serve as a second or floating platen as is normally required for double-action pressing of powdered metals.

All main press components are of steel construction. Heavy tierods assure over-all rigidity with a minimum of deflection. Ease of operation, as well as maintenance simplicity, is engineered into the design.

For more information, *write*



HIGH PRESSURE
LOW COST

This 8 pound Meehanite Metal casting made for the Joy Manufacturing Co. by Hamilton Foundry is a fourth stage air compressor cylinder. Pressures build up to 6,000 p.s.i. and require a high strength, pressure tight and wear resisting casting. Alloyed Meehanite®, oil quenched and tempered, raised Brinell hardness of the cylinder wall to 275-300, and increased tensile strength to 60,000 p.s.i. Meehanite was chosen for this casting because controlled structure and small uniform flake graphite produce pressure tight castings of uniform density and strength.

Manufacturing costs drop when uniform, high quality castings go through production. In this case, Meehanite castings from Hamilton Foundry give Joy tight control on finished parts costs by combining dimensional accuracy, uniform machinability, a low rejection rate, and delivery on schedule. Pressure tightness, long service life and fine surface finish insure Joy's reputation for product quality.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY

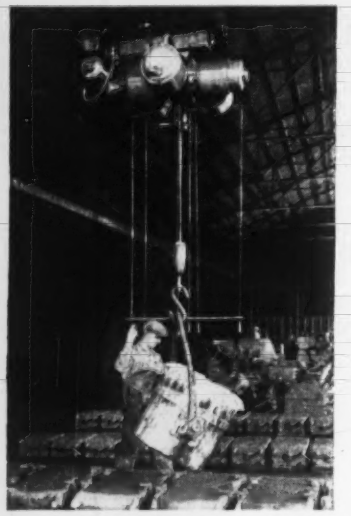
The Hamilton Foundry & Machine Co., 1551 Lincoln Ave., Hamilton, Ohio • TW 5-7491

SHEPARD NILES

HOISTS

CUT HANDLING COSTS

in YOUR plant with the right hoist



FLOOR-OPERATED HOIST

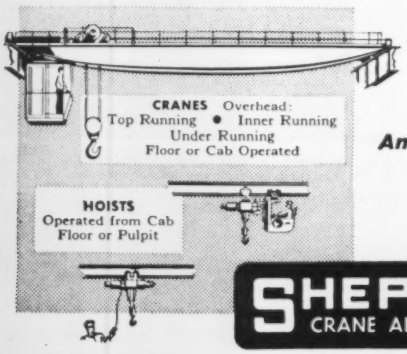
Operator primarily occupied with other duties, uses hoist for fast, efficient short hauls.

CAB-OPERATED HOIST

Cab operator moves loads at high speeds, can quickly spot material for handling.

WHICH Shepard Niles hoist fits your plant's needs . . . a floor-operated hoist where the operator is freed for other duties or a cab-operated hoist where the operator is engaged full time moving loads through the air? Shepard Niles manufactures both types in capacities from 1 to 20 tons.

Send for the descriptive bulletins on both Cab and Floor Operated Hoists . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building
America's Most Complete Line of Cranes and Hoists
Since 1903

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CRANE AND HOIST CORPORATION

2395 Schuyler Ave., Montour Falls, N. Y.

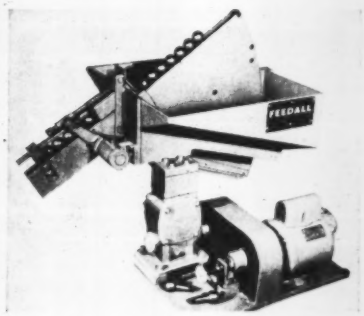
NEW PRODUCTS and equipment

Elmes Engineering Div., American Steel Foundries, 1150-U Tennessee Ave., Cincinnati 29, Ohio.

Headed-Parts Feeder Has Variable Speed

AUTOMATIC and continuous feed, transfer, or assembly of headed parts is provided by the Model 700 Feedall.

It has an electric control with variable speed from 10 to 20 strokes a minute.



The machine feeds sliding parts $\frac{1}{8}$ to 1 in. in diameter from 1 to 4 in. long; headed work of the same diameter, $\frac{1}{2}$ to 3 in. long. Hopper capacity is $1\frac{1}{2}$ cu ft.

Many flexible features, including automatic bank control devices, are available without special design.

An overload safety system is built in to protect moving parts from damage.

For more information, *write* Feedall Inc., 38399 Pelton Rd., Willoughby, Ohio.

Plastic Protects Metal

SMOOTH and wrinkled metal finishes, stainless steel, polished aluminum, nameplates, glass and plastic surfaces can be protected during manufacture, storage, and transit with Strip-Kote. It's a milky colored, concentrated plastic emulsion (applied by brush or spray) which dries to a transparent, tough film. It contains no inflammable solvents.

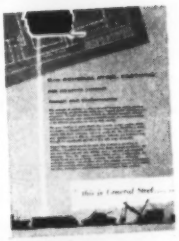
Coverage is 500 sq tt per gallon for a 0.04 in. dried film.

For more information, *write* Chemical Consulting Service, 3711 S. Clement Ave., Milwaukee 7, Wis.

...where industrial progress is cast in steel

Accurate measurement of ingredients and periodic analysis insure the correct chemistry for the many different alloys produced at General Steel.

METALLURGICAL SERVICE... EXPERT ANALYSIS AND COUNSEL



Write for folder: **How General Steel Castings Can Improve Product Design and Performance.** General Steel Castings, Station 230 Granite City, Illinois.

Optimum design in cast steel structures for your products can be gained only through application of a *complete* range of services. One of these is our metallurgical service consisting of expert counsel and accurate control of steel analysis... another area in which General Steel is well equipped and staffed.

This expert metallurgical counsel and the facilities of each of our laboratories are available for solving metallurgical problems for customers.

A vast backlog of knowledge and experience is available to you. Let us work with you from the "raw-idea" stage... in this way you benefit from our complete services from creative analysis and engineering to follow-through of performance in the field.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. · EDDYSTONE, PA. · AVONMORE, PA.

WORLDS
LARGEST
STOCK
52100
STEEL
Peterson
STEELS, INC.
Union, New Jersey • Detroit, Michigan • Melrose Park, Illinois

NEW literature

Write directly to the company for a copy

Fire Extinguishers Compared

A folder, "A Guide to Fire Extinguishers," contains a table which compares various types of extinguishers and the comparative effectiveness of extinguishing agents according to Underwriters' Laboratory ratings. Fire Equipment Div., Ansul Chemical Co., Marinette, Wis.

Machine Tool Replacement

"Avoidable Costs" outlines a formula for machine tool and capital equipment replacement. Jones & Lamson Machine Co., Springfield, Vt.

Aluminum Finishing Manual

A booklet discusses different problems concerning the finishing of aluminum as well as methods and materials for taking care of these problems. Frederick Gumm Chemical Co. Inc., 538 Forest St., Kearny, N. J.

New Concepts in Recording

A 16-page booklet describes various methods of recording and identifies and defines those circumstances under which direct writing recording systems provide maximum benefit to industrial users. Brush Instruments Div., Clevite Corp., E. 37th Street & Perkins Avenue, Cleveland 14, Ohio.

Luminous Wall Heating

"Instantaneous Heat," 48 pages, describes a new combustion system for gas-fired, infrared heat treating furnaces. A. F. Holden Co., Detroit, Mich.

Packaging Guide

"How To Pack It," a 32-page booklet, gives information on selection of corrugated packaging. Both standard and special designs are described. Hinde & Dauch Div., West Virginia Pulp & Paper Co., Sandusky, Ohio.

Galvanized Steel Buyers' Guide

"Industrial Procurement — Galvanized Steel Sheets," 16 pages, describes the significant factors governing selection, purchase, and maintenance of galvanized steel sheets for industrial use. Principal producers are listed. American Zinc Institute Inc., 60 E. 42nd St., New York 17, N. Y.

Diesel Engines

Bulletins BU-540 and MS-1328 show design, construction, and mechanical advantages of two new powerplants, the 21000 and the 16000 diesel engines. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Investment Casting Data

A design guide has been compiled by the Investment Casters Society to provide pertinent information to designers and potential users of investment castings. Picco Industries, 1729 N. Chico Ave., El Monte, Calif.

UNITED®

4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

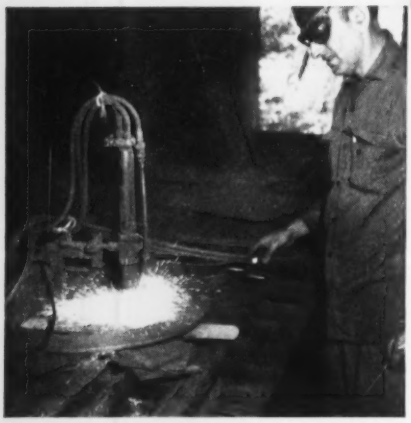
SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

In-Stock Service

on Carpenter Stainless No. 20 and No. 20Cb

forms, sizes and shapes for most corrosion problems



● Besides keeping our warehouses fully stocked with all forms of Carpenter Stainless No. 20 and 20Cb, we maintain fast, modern facilities to make up and speed your orders to you . . . no matter what your deadline. *Our service teams are geared to handle your most urgent delivery needs.*

Available from stock in sheet, plate, pipe, tubing, strip, bars, wire and billets, Carpenter Stainless No. 20 and 20Cb are as easily fabricated as ordinary stainless steels. You get long-life control of sulphuric acid and other severe corrodents in a hurry when you order Stainless No. 20 and 20Cb. One installation of this Super-Stainless will outlast most other corrosion-resistant alloys . . . economically. Contact our nearest office or authorized distributor (located in over 40 cities, coast to coast). Write on your company letterhead for technical bulletin 108A. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

your master key to cost-saving corrosion control

Carpenter

Stainless No. 20 & 20Cb

Carpenter Stainless No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

May 11, 1959

Inventory Buildup Is Slower than Expected

STEEL SHIPMENTS will exceed consumption by more than a million tons this month, but the inventory buildup isn't progressing as rapidly as expected. If the United Steelworkers hit the bricks on July 1, more than a few consumers will be seriously threatened. If the walkout lasts more than three or four weeks, some may have to close their doors.

UPTURN BOOSTS CONSUMPTION— Main reason for inventory deficiencies is the suddenness of the recovery. Metalworking executives had no idea that their sales would improve so rapidly. Each time they've stepped up production, they've had to raise their inventory objectives. But since they underestimated second quarter requirements, they've had to divert steel purchased for stock to immediate use.

AUTOMAKERS ON SPOT— Although they can normally get what they want from the steel companies, automakers seem apprehensive about their inventories. Ford Motor Co. and American Motors Corp., after repeatedly boosting production schedules, are in the market for extra tonnage. Chrysler Corp. wants its inventory at 45 days by the end of May and 90 days on July 1. Ford, currently at 30 days, has similar objectives. One of the smaller companies has a 40 day supply and thinks it will be lucky if it can push its stocks up to 70 days by the end of June.

SHIPMENTS LAG— To compound the inventory crisis, steelmakers are behind schedule on shipments of flat-rolled products and heavy plates. Consumers face delays of three or four weeks on cold-rolled, hot-rolled, and galvanized sheets. A Chicago mill is telling customers that it's a month behind on plates and can't possibly keep all its second quarter commitments.

MORE TROUBLE AHEAD?— In the next four weeks, when pressure for deliveries is greatest, shipments may be hindered by a shortage of trucks and freight cars, plus labor unrest and wildcat strikes if contract negotiations appear deadlocked.

RUSH TO SERVICE CENTERS—Refusal by steel producers to accept any more orders for June delivery has triggered a run on service center stocks. An eastern warehouse recently shipped 60,000 lb of bars to a firm that normally buys from mills. First quarter sales of distributors were 25 per cent ahead of 1958 figures, and additional gains of 10 to 15 per cent are expected in the second quarter. For the most part, service centers will supply their regular customers when steel gets tight. They're in no position to backstop the mills.

THIRD QUARTER BRIGHTENS— It's increasingly apparent that there's more to the steel industry's revival than the artificial stimulus that strike hedging provides. Plates, galvanized sheets, and tin mill products will be in strong demand even if a strike is averted.

INGOT RATE HOLDS— Last week, steelmakers operated their furnaces at 94.5 per cent of capacity (unchanged from the previous week's rate) and produced 2,676,000 net tons of steel for ingots and castings.

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*Current prices were published in the May 4 issue and will appear in subsequent issues.

Metalworking Outlook—Page 91 Technical Outlook—Page 143

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Photo courtesy Elkhart Brass Mfg. Co., Elkhart, Indiana

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Distributors Back Steelmen

The American Steel Warehouse Association agrees that productivity or prices must go up if labor is granted a wage boost. Inflation condemned at Chicago meeting

STRONG support for the steel industry in its fight to hold the line on prices and wages was voted at the 50th annual meeting of the American Steel Warehouse Association at Chicago last week.

A resolution declaring inflation is one of the gravest dangers facing the nation was adopted by the association's board. It was held that steelmakers cannot absorb increased labor costs without productivity advances or price increases.

Similarly, the steel service centers can't absorb higher material costs. They'll have to raise prices if their bill from the mill goes up. The effects would immediately be felt by the distributors' 500,000 customers, it was said.

The incoming president of the association, George L. Stewart, vice president, Warehouse Div., Jones & Laughlin Steel Corp., believes the steel industry will fight a wage boost at this time. Other prominent members of the association think in a like vein, indicating they anticipate a strike this summer. Most warehouses are reported adequately stocked to care for regular customers' needs through the summer (see STEEL, May 4, p. 39).

Emphasis at the business sessions of the four day meeting was on management problems steel distributors will face in the next 50 years. Featured speakers included: Dr. Charles H. Malik, president, 13th General Assembly, United Nations; Dr. John Van De Water, University of California; Desmond Barry, Galveston Truck Line, Galveston, Tex.; Edward L. Ryerson, retired chairman, Inland Steel Co.; Clayton P. Fisher Jr., General Electric Co.

Distributors . . .

Prices, Page 212

Distributors report a substantial influx of orders for a wide range of products. This is due to the inability of mills to accept any additional business in most products for second quarter delivery. Some purchases are being made to fill gaps made by delayed mill shipments.

Steel service centers have substantial inventories of all products with the exception of sheets which are tight. Second quarter shipments are expected to range from 15 to 20 per cent higher than in the first quarter.

Imports are not affecting the Seattle market but are a serious problem in the Portland, Oreg., area. Reinforcing bars lead the imports in volume at that point. Some Japanese plates and sheets also have been landed on the West Coast. The established domestic firms are holding the price line, but some price cutting is attributed to fly-by-night concerns.

Baker Steel & Tube Co., a subsidiary of Earle M. Jorgensen Co., Los Angeles, has opened a service center at 1255 22nd St., San Francisco, Calif., stocking steel and aluminum tubular products.

NEWLY ELECTED officers of the American Steel Warehouse Association: (left to right) C. L. Hardy, president of Joseph T. Ryerson & Son Inc., Chicago, chairman of the executive committee; Ralph W. Shaw Jr., president of A. R. Purdy Co., Lyndhurst, N. J., vice president; William F. Colclough, president of Cincinnati Steel Products Co., Cincinnati, vice president; George L. Stewart, vice president of Jones & Laughlin Steel Corp.'s Warehouse Div., Indianapolis, president; W. R. Winter, president of Williams Hardware Co., Minneapolis, vice president; and Robert G. Welch, Cleveland, executive vice president

Sheets, Strip . . .

Sheet & Strip Prices, Pages 208 & 209

Sheets and strip are tight. Practically all mills are booked well into the third quarter, and many are losing ground in making deliveries. Automakers are seeking additional tonnages for May and June delivery, but their prospects of getting them are dim. Carryover into next quarter will average at least one month.

Consumption is running ahead of expectations. As a result some consumers are straining every effort to build up stocks, even though deliveries run into the third quarter, and there is a possibility of higher prices on such shipments. A portion of forward buying is being done to get a priority on rolling schedules in case of a summer shutdown. July-August will bring some easing in consumption as usual, but in case of a strike, July orders would move back to September. Most third quarter orders are arranged for shipment that month.

Bethlehem Pacific Coast Steel Corp. reports flat-rolled galvanized products solidly booked to September. Fabricators on the West Coast are scrambling for supplies as distributors report shortages. Japanese galvanized material, avail-

able in good quantity, is priced above domestic.

"Almost everyone wants galvanized sheets now," says a spokesman for Granite City Steel Co., Granite City, Ill. The mills of this firm, as well as many others, continue to operate at capacity, but are unable to meet demands fully. Leadtime on sheets is 45 days before the first of the month scheduled for delivery. Granite City is making only corrugated galvanized but is preparing to mill flat.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 208

Demand for reinforcing bars is heavier.

Although still under pressure, prices for fabricated bars in New England are somewhat steadier except for bridge tonnage. Competition for highway structures is intense. Suppliers are generally meeting delivery promises but are finding this more difficult.

Effort is being made in the Pacific Northwest to expedite current commitments in view of the strike threat. Backlogs are fairly comfortable in that area. Several major reinforcing bar projects are scheduled for placement before July 1.

Steel Bars . . .

Bar Prices, Page 207

A few mills producing hot-rolled bars can still enter tonnage for second quarter delivery but only on certain sizes and in relatively small amounts. The tight situation has stimulated buying for July. Producers anticipate good operations for that month if there isn't a steel strike.

Fastener manufacturers and cold drawers are especially interested in future positions, as compared with most other consuming lines. Cold drawn steel can be had for this quarter where converters can draw on hot stock inventories. In many instances, this limits greatly the range of tonnage that can be handled in this quarter.

Bar producers in the Los Angeles district are booked solidly through May and are accepting orders for delivery through the third quarter.

Plates . . .

Plate Prices, Page 207

Plate demand is strong with supplies limited. Mills are virtually booked solidly for the second quarter and are cautious in making third quarter promises. One midwestern mill, for instance, has a one month carryover on plates and says prospects are dim for an improvement by midyear.

Another mill has notified its plate customers that it is one month in arrears in making deliveries. Its problem, however, is the result of a construction program which interferes with obtaining maximum production on its plate mill.

Structural fabricators, tank shops, and pipe lines are consuming large tonnages. Freight car builders continue to step up their needs, although a leveling off is expected soon as equipment orders appear to have passed their peak, at least for the time being. Ship requirements are tapering, although still involving a heavy tonnage.

Clad and head order backlogs are light. Orders for clad plates have not kept pace with carbon

in furnace lining . . .

Plicast Monolithic Castables

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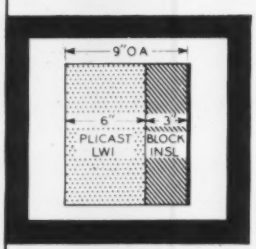
4 **Larger furnace capacity with Plicast.** The thinner walls added 6 inches in width, 3 inches in depth and height to the inside dimensions.



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or: .0012 gal. oil

FIRE BRICK
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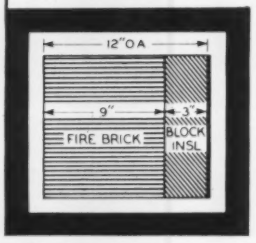
42,000 btu = 42 cu. ft. gas
or: .29 gal. oil
Heat loss: 270 btu/sq. ft.
(still air at 70° F.)
270 btu = 0.263 cu. ft. gas
or: .0019 gal. oil



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and alloy grades in forward covering. Despite longer processing, clad material can be shipped in six to eight weeks; pressed and spun heads, in four to six weeks.

The general contract has been placed for a ballistic missile installation near Spokane, Wash., involving large storage vessels (500 tons or more of plates).

Stainless Steel . . .

Stainless Steel Prices, Page 211

Production of stainless and heat resisting steel ingots in the first quarter, 1959, totaled 346,167 net tons, reports the American Iron & Steel Institute. In the preceding quarter 300,522 tons were produced, and in the first quarter, 1958, output was only 167,821 net tons.

The total in the first three months this year was the largest for any quarter since the closing three month period in 1956 when 360,823 tons were produced.

In all of 1958 production was 892,984 tons vs. 1,000,357 in 1957 and 1,200,569 in 1956.

Calstrip Steel Corp., Los Angeles, has started production of stainless steel strip. It will be rolled on a Sendzimir mill in widths up to 13 in. in a thickness range of 0.008 to 0.075 in. The company also rolls strip in low carbon and spring steels.

Tubular Goods . . .

Tubular Goods Prices, Page 211

Most users of seamless pipe, including utilities, are covered through June, and some letdown in third quarter bookings is expected. Distributors are not placing forward orders for buttweld pipe in heavy volume because availability of tonnages for shipment within ten days retards the building of inventory. Consumption and spot ordering are heavier for construction.

Bethlehem Steel Co., Bethlehem, Pa., will fabricate 21,000 linear ft of 30 in. caisson pipe for the foundations of the Prudential Tower, Boston.

Demand for oil country goods remains strong. For the fourth consecutive week, rotary drilling operations in the U. S. set a 1959 high, according to a weekly survey by the Hughes Tool Co., Houston. The firm counted 2108 rigs in operation, an increase of 27 over the previous week. Texas drilling also continues upward, with 770 rigs running vs. 760 the previous week. The national figure represents a gain of 317 rigs over the last week in April a year ago.

Wire . . .

Wire Prices, Pages 209 & 210

Wire products generally are closed out for the second quarter. Some third quarter business is being accepted. Mills in New England will ship most second quarter tonnage without carryovers, and in most instances users of industrial grades will have accumulated close to a 60 day inventory.

Producers are meeting this moderately heavier demand without extension in deliveries beyond the usual leadtime in most instances. Wire mills are operating 10 to 15 points under the steel industry average.

Demand for stainless steel wire is described as booming. Manufacturers wire is holding up well, primarily because auto production is strong.

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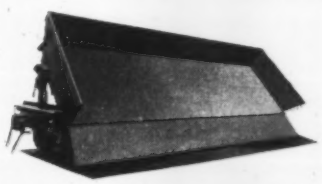

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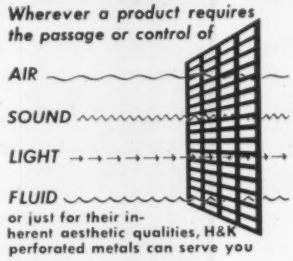

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Container Shipments Rise

Shipments of steel pails totaled 5,448,946 units in February, an increase of 9 per cent above January shipments and 19 per cent above the February, 1958, total, reports the Bureau of the Census. Shipments during the first two months of the year totaled 10,457,214 units against 9,993,095 units in the same period last year.

Movement of steel shipping barrels and drums in February comprised 2,561,711 units, a drop of 2 per cent from the preceding month, but an increase of 11 per cent over the February, 1958, total. Cumulative total for the first two months of 5,166,306 units compared with 4,894,099 units in the corresponding period of 1958.

Tool Steel . . .

Tool Steel Prices, Page 211

Shipments of high speed and tool steel (excluding hollow drill steel) increased to 9584 tons in March from 7646 tons in February, reports the American Iron & Steel Institute, New York. That compares with 5773 tons in March, 1958.

The March, 1959, total was the highest for any month since the 10,132 tons in the same month two years ago.

Cumulative shipments in the first quarter were 24,778 tons compared with 17,951 tons in the like period a year ago and 28,771 tons two years ago.

Ferroalloys . . .

Ferroalloy Prices, Page 214

Union Carbide Metals Co., a division of Union Carbide Corp., New York, has made a revision in charge chrome grades and prices. Prices are per pound of contained chromium for carload lots of lump material in bulk: Charge chrome 1 (maximum 63 per cent Cr, 6 per cent C, and 7 per cent Si), 22.0c; charge chrome 2 (50-59 per cent Cr, maximum 8 per cent C, and 6 per cent Si), 23.0c; refined chrome 1 (30-59 per cent Cr, maximum 5 per cent C, and 2 per cent Si), 25.0c; and refined chrome 2 (50-59 per cent Cr, maximum 5 per cent C, and 12 per cent Si), 24.0c.

Opens Merchant Bar Mill

Alaska Steel Mills Inc., Fairbanks, Alaska, will place its merchant bar mill at Seattle in production May 15. Output of the mill will include reinforcing steel and merchant carbon bars.

Rails, Cars . . .

Track Material Prices, Page 210

Railroads are buying new equipment at a pretty fair clip now that an increasing volume of freight traffic is in sight. The buying, superimposed on an already tight market, is affecting light plates and light structurals for freight cars. Rails and track accessories are also being purchased more freely.

Canada . . .

Consolidated Mining & Smelting Co. of Canada Ltd. is completing arrangements for construction of a steel plant at Kimberly, B. C., to cost $20 million. Plans call for production of pig iron to start early in 1961 with initial annual capacity of 36,500 tons. When completed, production will include steel ingots, billets, and rolled steel products with output of 100,000 tons yearly.

For the week ended Apr. 25, production of steel ingots in Canada amounted to 114,826 tons (94.6 per cent of capacity) against 112,822 tons (92.9 per cent) in the preceding week.

Ryerson Tries a New Warehouse Price Plan

A new system of warehouse steel pricing is being tried by Joseph T. Ryerson & Son Inc.'s Pittsburgh facility. It involves a new method of figuring the schedule of quality extras and discounts based on actual item costs.

In some cases, prices are advanced; in others, they're reduced. The net effect: A pricing structure that more accurately reflects costs on each item and size.

The new plan, described at the American Steel Warehouse Association's annual meeting last week (Page 197), grew out of an extensive cost study based on distribution cost analysis. It became effective May 1—but only at the firm's Pitts-

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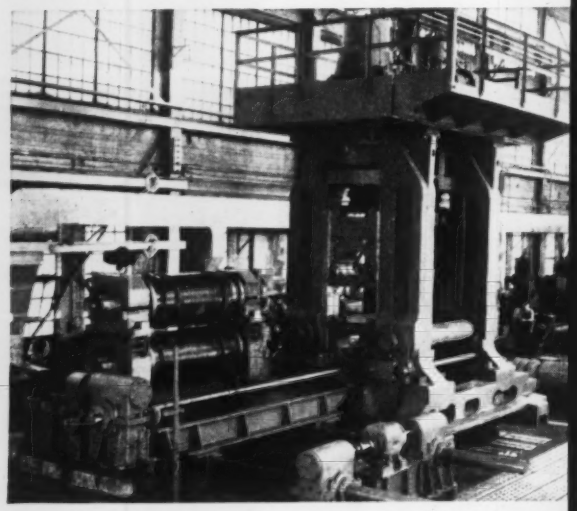

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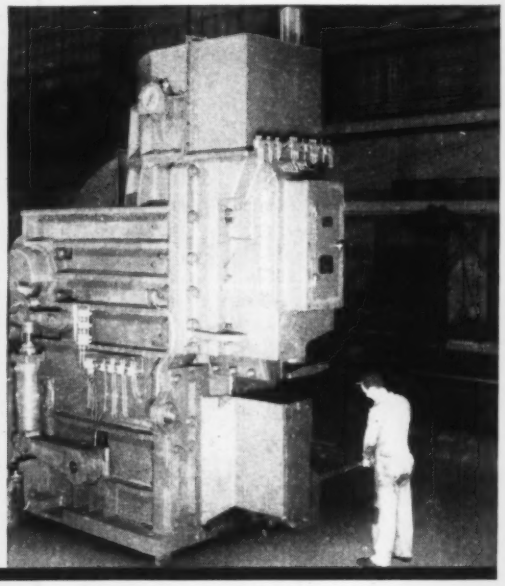

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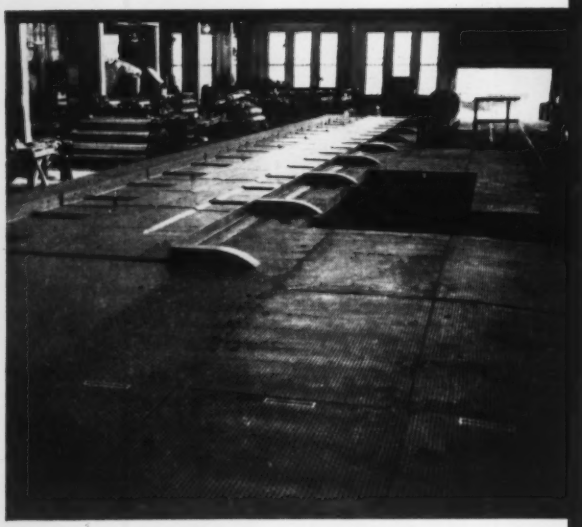

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burgh warehouse. Its extension to other districts will probably depend on how it works out there.

Quantity extras and discounts are not new in the warehouse industry; they've been in vogue since the early 1920s.

Structural Shapes . . .

Structural Shape Prices, Page 207

Leading structural shape mills are booked up completely for the quarter on wide flange beams and have little left in the standard sections. So buying for third quarter delivery is being accelerated.

Fabricators are slow to order beyond jobs in hand. Requirements of jobs vary, and it is difficult to buy accurately for inventory. Structural awards are not quite as numerous as they were a month ago but continue to account for substantial tonnage. Competition among fabricators has whittled quotations down to uncomfortably low levels—another reason advance buying is at a minimum.

There is a considerable tonnage, notably bridges, on which New England shops are not covered. They are entering plain material orders for third quarter delivery for specified work. A shutdown of structural mills for an extended period would result in a shortage of some sizes and shapes within a few weeks.

Fabricators on the West Coast take a gloomy view of the second half. Threat of a midsummer shutdown has prompted advancement of several major projects, resulting in a number of rush jobs on which contractors desire delivery by July 1. So some see little new work in the last two quarters.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

725 tons, Clear, Alaska, Air Force project, reported to Gate City Steel Inc., Boise, Idaho; Baker & Ford, Bellingham, Wash., general contractors.

240 tons, substation projects, various sites, to Bethlehem Pacific Coast Steel Corp., Seattle, by Bonneville Power Administration, Portland, Oreg.

150 tons, wide flange, General Supply Office, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

14,000 tons, transmission tower; bids to Bonneville Power Administration, Portland, Oreg.

2218 tons, transmission line projects, King, Kittitas, Chelan, and Douglas counties, Washington; bids to Bonneville Power Administration, Portland, Oreg., May 11 and 26, and June 9 and 23, respectively.

1245 tons, intake gates and stoplogs, Tuscarora powerplant; bids May 21, f.o.b. Niagara Falls, N. Y., to Power Authority, State of New York, N. Y.

1120 tons, three radar towers; bids to U. S. Engineer, Seattle, advanced to May 12 from May 5.

1090 tons, gates and structures, dam, Snake River; bids in to U. S. Engineer, Walla Walla, Wash., May 6.

700 tons, Atlas ballistic missile project, near Spokane, Wash.; general contract to S. Patti Construction Co., MacDonald Construction Co., C. H. Leavell & Co., St. Louis, joint second low bid $6,859,000, to U. S. Engineer, Seattle.

680 tons (also 150 tons of reinforcing), Washington state, two span Yakima County; John E. Alexander, Seattle, general contractor.

600 tons, Idaho state law enforcement building, Boise, Idaho; R. E. Rice Construction Co., Boise, low base, $1,859,417.

125 tons, warehouse and cold storage building, Wenatchee, Wash.; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

470 tons, First Hill apartment, Seattle, to Mercer Steel Co., Seattle; Teufel Construction Co., Seattle, general contractor.

190 tons, Washington state King County span, to Northwest Steel Rolling Mills Inc., Seattle; Northwest Construction Co., Seattle, general contractor.

120 tons, Westward Hotel, Anchorage, Alaska, and high school, Granger, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1350 tons, ballistic missile project near Spokane, Wash.; general contract to S. Patti Construction Co. and associates, St. Louis.

300 tons, Washington state, two spans, King County; general contract to Ostruske-Murphy Inc., Tacoma, Wash.

260 tons, Idaho state highway projects; bids to Boise, May 19.

250 tons, Washington state, two girder spans, King County; bids to Olympia, May 19.

PLATES . . .

PLATES PLACED

425 tons, carbon hull, General Supply Office, Navy, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

PLATES PENDING

500 tons or more, fuel storage facilities, ballistic missile project near Spokane, Wash.; general contract awarded.

200 tons, 500,000-gal elevated tank, AFB, Minot, N. Dak.; bids May 20, U. S. Engineer, Omaha, Nebr.

200 tons or more, two steel water tanks, 1.3 million gal capacity; bids to Kent, Wash., May 14.

100 tons, grade Hy-80; bids May 11, Navy Purchasing Office, Washington.

100 tons, 200,000-gal elevated tank, NAS, Whidbey Island, Wash.; bids May 20, public works officer, Navy, Seattle.

PIPE . . .

CAST IRON PIPE PENDING

1400 tons, Kent County, District No. 93, Mercer Island, Wash.; bids in.

396 tons, King County, District No. 49, Washington; bids in.

172 tons, King County, District No. 68, Washington; bids in.

85 tons; bids in to Omak, Wash., May 1.

RAILS, CARS . . .

RAILROAD CARS PLACED

Seaboard Air Line, 1000 box cars, costing about $11.3 million, with 700 going to the Pullman-Standard Car Mfg. Co.'s plant at Bessemer, Ala., and 300 to the Magor Car Corp., New York.

Northern Pacific Railway, fifty, 50 ton refrigerator cars, to Pacific Car & Foundry Co., Renton, Wash.

Northern Pacific, 599 freight cars, including 99 seventy-ton covered hopper cars (74 have been placed with Pullman-Standard Car

ULBRATHIN

the finest quality thin gauge Stainless Steel and super alloy strip available from .0005 to .008 in the 200, 300, and 400 series, and the super alloys. Precision rolled on our

SENDZIMIR MILLS

and bright annealed in our controlled atmosphere of cracked ammonia or pure hydrogen furnace. Orders from one pound to production runs are supplied within two to three weeks. For your thin gauge requirements, specify **Ulbrathin.**

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SINCE 1924
Ulbrich
"the biggest little mill in the country"

STAINLESS STEELS
WALLINGFORD, CONN.
Phone: COlony 9-7771
TWX Wallingford, Conn. 277

Mfg. Co., Chicago, 25 with the Greenville Steel Car Co., Greenville, Pa.) and 500 box-cars with the railroad's own shops at Brainerd, Minn.

Atchison, Topeka & Santa Fe, 25 seventy-ton mechanical refrigerator cars, to own shops.

Pig Iron . . .

Pig Iron Prices, Page 212

Shipments of foundry iron this month are the heaviest reported this year. Most gray iron and malleable foundries are melting on a five-day week schedule. They generally do not have substantial stocks and are taking shipments in line with operations. Foundries turning out railroad and automotive castings are especially active.

The movement of pig iron west on the Great Lakes from Buffalo is picking up steadily with numerous sailings booked for May and June. The movement is considerably heavier than at this time a year ago. Present prospects are for a big season.

Iron Ore . . .

Iron Ore Prices, Page 213

Stocks of iron ore in the U. S. and Canada at the end of March totaled 44,940,239 tons, reports the American Iron Ore Association, Cleveland. At the end of March a year ago, the total was 53,051,633 tons.

Consumption of iron during the month totaled 12,071,858 tons vs. 7,361,414 in the like month of 1958. The cumulative total to the end of March was reported at 32,575,501 tons against 22,253,550 tons in the first quarter of last year.

At the end of March, 236 of 276 blast furnaces were in operation (224 in the U. S. and 12 in Canada). At the same time a year ago, active stacks numbered 169 (158 in the U. S. and 11 in Canada).

Receipts of iron ore and ore agglomerates totaled 10,047,216 gross tons in the first quarter of this year, compared with 8,363,924 tons in the like period a year ago. Receipts this year have included 4,759,903 tons of U. S. ores (326,762 Lake Superior and 4,433,141 other); 404,885 tons of Canadian (193,716 Lake Superior and 211,169 other); and 4,882,428 tons of foreign ores.

Shipments of Lake Superior iron ore totaled 2,978,023 tons in April, compared with only 62,560 tons in April a year ago. Of this year's shipments, 2,910,070 tons were from U. S. ports and 67,953 tons from Canadian ports.

Iron Ore Statistics—March, 1959

Stocks on hand at furnace yards and docks at end of month
(Gross tons)

	—U. S. Ores—		—Canadian Ores—		Foreign	
At U. S. Furnace Yards:	L. Superior	Other	L. Superior	Other	Ores	Total
Eastern	3,221,262	199,064	100,182	1,027,025	4,281,696	8,829,229
Pitts.-Youngstown	5,874,402	43,870	392,666	1,479,294	3,398,391	11,188,623
Cleveland-Detroit	5,949,406	114,509	139,226	261,652	365,592	6,830,385
Chicago	6,656,993	(a)	(a)	.....	(a)	6,656,993
Southern	(a)	1,952,969	.....	(a)	2,178,853	4,131,822
Western	.....	964,606	.....	.....	.....	964,606
Total	21,702,063	3,275,018	632,074	2,767,971	10,224,532	38,601,658
At U. S. Docks:						
Lake Erie	3,007,515	.....	91,193	1,470,695	.....	4,569,403
Other	.....	.....	.....	(a)	(a)	(a)
Total U. S. Stocks	24,709,578	3,275,018	723,267	4,238,666	10,224,532	43,171,061
Canadian Stocks	1,302,794	.....	71,792	324,263	70,329	1,769,178
Total U. S.-Canada	26,012,372	3,275,018	795,059	4,562,929	10,294,861	44,940,239

Consumption in U. S. and Canada During March, 1959
(Gross tons)

	—U. S. Ores—		—Canadian Ores—		Foreign	
In U. S. Districts:	L. Superior	Other	L. Superior	Other	Ores	Total
Eastern	859,833	235,256	23,738	262,490	1,058,467	2,439,784
Pitts.-Youngstown	2,229,405	138,782	128,913	409,263	606,240	3,512,603
Cleveland-Detroit	1,342,753	31,075	85,093	56,533	156,591	1,672,045
Chicago	2,361,099	(a)	(a)	.....	(a)	2,361,099
Southern	(a)	571,697	.....	(a)	281,533	853,230
Western	.....	673,480	.....	.....	.....	673,480
In U. S.:						
Blast furnaces	5,057,445	1,010,610	198,148	447,713	659,051	7,372,967
Steel furnaces	197,268	89,228	560	8,856	594,124	890,036
Sintering (1)	1,538,377	545,831	39,036	271,717	849,656	3,244,617
Miscellaneous (2)	.....	4,621	.....	.....	.....	4,621
Total U. S.	6,793,090	1,650,290	237,744	728,286	2,102,831	11,512,241
In Canada:						
Blast furnaces	254,036	.....	91,038	81,390	.....	426,464
Steel furnaces	6,104	.....	.....	17,430	6,896	30,430
Sintering (1)	63,386	.....	18,799	20,538	.....	102,723
Miscellaneous	.....	.....	.....	.....	.....	.....
Total Canada	323,526	.....	109,837	119,358	6,896	559,617
Total U. S.-Canada	7,116,616	1,650,290	347,581	847,644	2,109,727	12,071,858

1. Iron ore consumed in sintering plants not at mine site. 2. Sold to nonreporting companies or used for purposes not listed. (a) Data included in other districts.
Data from American Iron Ore Association.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

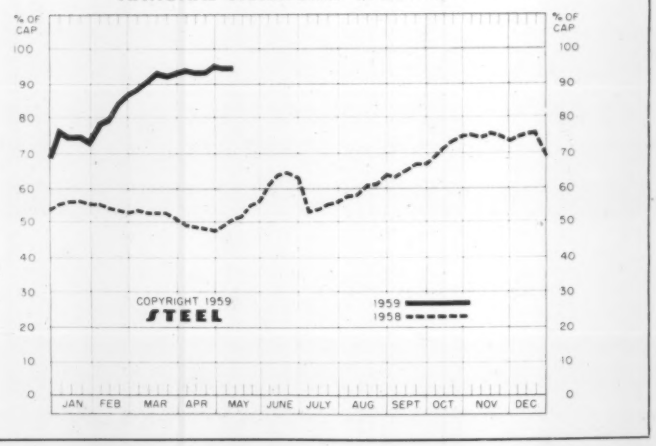
	Week Ended May 10	Change	Same Week 1958	Same Week 1957
Pittsburgh	97.5	+ 4*	51	92.5
Chicago	95.5	+ 1*	54.5	88
Eastern	97	+ 1	48	95.5
Youngstown	94	+ 2	45	84
Wheeling	92	+ 1	68	81.5
Cleveland	99	+ 3.5*	27.5	86.5
Buffalo	105	+ 2.5	34.5	92.5
Birmingham	90.5	— 2.5	65	95.5
Cincinnati	96	— 6.5*	28.5	69
St. Louis	105.5	0*	75.5	84
Detroit	98	— 1	33.5	82.5
Western	94.5	— 0.5	67	99
National Rate	94.5	0	50	87

INGOT PRODUCTION‡

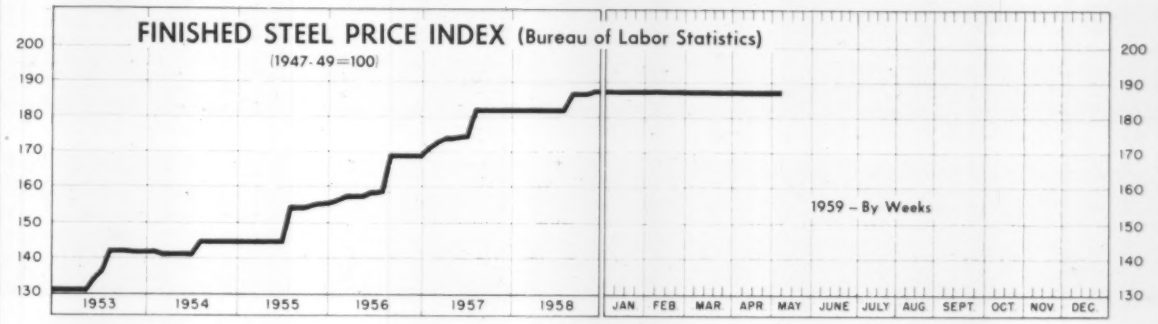
	Week Ended May 10	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	166.1†	163.5	164.4	83.0
NET TONS (In thousands)	2,668†	2,627	2,641	1,334

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



May 5, 1959	Week Ago	Month Ago	April Avg.	Year Ago
186.7	186.7	186.7	186.7	181.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.615
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.253
Pipe, Line (100 ft)	199.530
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.722
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	May 6 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.70
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	33.67	34.33	36.17	32.00	27.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	May 6 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.725	4.405
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.10
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.10
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.65
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate(1.50 lb)box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton

	May 6 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$34.50	$36.50	$36.50	$31.50	$28.50
No. 1 Heavy Melt, E. Pa.	33.50	33.50	34.50	34.50	23.00
No. 1 Heavy Melt, Chicago	33.00	33.00	37.50	30.00	30.50
No. 1 Heavy Melt, Valley	35.50	35.50	40.50	33.50	29.50
No. 1 Heavy Melt, Cleve.	33.50	33.50	36.50	30.50	26.50
No. 1 Heavy Melt, Buffalo	32.50	32.50	34.50	26.50	25.50
Rails, Rerolling, Chicago	56.50	57.50	59.50	49.00	41.00
No. 1 Cast, Chicago	46.50	45.50	46.50	38.50	38.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

Nameless terrors lurk in the shadows . . .
doubly terrifying because they are unknown . . .

Even adults are sometimes afraid of the dark

It's only human to avoid hidden truths that could disturb us. So we worry about cancer, instead of doing something about it.

Wouldn't a checkup be more constructive? Most likely it will prove there's nothing to worry about. But please remember: Cancer can now be cured, in many cases, when detected early enough.

And one more thing . . .

While you think about it, make out a check to the American Cancer Society. Your contribution is desperately needed for research that can bring this killer under complete control. For cancer *will* be conquered—never fear.

Guard your family . . . fight cancer with a checkup and a check

Send your gift to "Cancer" in care of your local post office.

American Cancer Society

Steel Prices

Mill prices as reported to STEEL, May 6, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 208; footnotes, page 210.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)
Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 101.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 109.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 ..... 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.SanFrancisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 ..... 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 ..... 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS
AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo,Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
N.Tonawanda,N.Y. B11 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange
Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Sterling,Ill. N15 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Sterling,Ill. N15 ..... 7.75
Struthers,O. Y1 ..... 8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05
Sterling,Ill. N15 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Harrisburg,Pa. P4 ..... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown (27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 7.05
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron
Economy,Pa. B14 ..... 13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. C22 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 ..... 7.50
Coatesville,Pa. L7 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana, Calif. K1 ..... 8.20
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5 W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES
Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
IndHarbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..... 5.55
Ashland l.c.l.(15) A10 ..... 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. c.l. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa. (9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O. (23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Emeryville,Calif. J7 ..... 6.425
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P22 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O. (23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
N.T'wan'a,N.Y.(23) B11 ..... 6.025
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle A24, B3, N14 ..... 6.425
S.Ch'e'go(9)R2,U5,W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9) B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Loaded (Including loaded extra)
Carbon
LosAngeles P2, S30 ..... 11.75*
Alloy
Ambridge,Pa. W18 ..... 10.175
BeaverFalls,Pa. M12 ..... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(49) S30 ..... 9.10
LosAngeles(49) P2, R2 ..... 9.10
Mansfield,Mass. B2 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn. W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 ..... 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 ..... 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2 ..... 9.025
Hartford,Conn. R2 ..... 9.325
Harvey,Ill. B5 ..... 9.025
Lackawanna,N.Y. R2 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield,Mass. B5 ..... 9.325
Massillon,O. R2, R8 ..... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 ..... 9.225
S.Chicago,Ill. W14 ..... 9.025
SpringCity,Pa. K3 ..... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025
Waukegan,Ill. A7 ..... 9.025
Willimantic,Conn. J5 ..... 9.325
Worcester,Mass. A7 ..... 9.325
Youngstown F3, Y1 ..... 9.025

BARS, Reinforcing, Billet (To Fabricators)

Alabama City, Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse, Mich. G5 ....5.675
Emeryville, Calif. J7 ..6.425
Fairfield, Ala. T2 .....5.675
Fairless, Pa. U5 .....5.825
Fontana, Calif. K1 ....6.375
Ft. Worth, Tex (4) (26) T4 5.925
Gary, Ind. U5 .....5.675
Houston S5 .....5.925
Ind. Harbor, Ind. I-2, Y1 5.675
Johnstown, Pa. B2 ....5.675
Joliet, Ill. P22 .....5.675
Kansas City, Mo. S5 ....5.925
Kokomo, Ind. C16 ....5.775
Lackawanna, N.Y. B2 ..5.675
Los Angeles B3 .....6.375
Madison, Ill. L1 .....5.825
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ...6.125
Niles, Calif. P1 .....6.375
Pittsburg, Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ....6.425
Sand Springs, Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S. Chicago, Ill. R2, W14 .5.675
S. Duquesne, Pa. U5 ...5.675
S. San Francisco B3 ....6.425
Sparrows Point, Md. B2 ..5.675
Sterling, Ill. (1) N15 ...5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ...6.10
Torrance, Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated; To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown, Pa. B2 .....7.33
Kansas City, Mo. S5 ....7.60
Lackawanna, N.Y. B2 ..7.35
Marion, O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
Sand Springs, Okla. S5 ..7.60
Seattle A24, B3, N14 ...7.95
Sparrows Pt., Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport, Pa. S19 ...7.25

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 14.90
Economy, Pa. (D.R.) B14 18.55
Economy (Staybolt) B14 19.00
McK. Rks. (S.R.) L5 ...14.50
McK. Rks. (D.R.) L5 ..19.80
McK. Rks. (Staybolt) L5 20.95

BARS, Rail Steel

Chicago Hts. (3) C2, I-2 5.575
Chicago Hts. (4) (44) I-2 5.675
Chicago Hts. (4) C2 ...5.675
Franklin, Pa. (3) F5 ...5.575
Franklin, Pa. (4) F5 ...5.675
Jersey Shore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-rolled Steel (18 Gage and Heavier)

Lackawanna, N.Y. B2 ..5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland, Ky. (8) A10 ...5.10
Cleveland J5, R2 ....5.10
Conshohocken, Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
Granite City, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky. A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth, O. P12 ....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14 .5.10
Sparrows Point, Md. B2 ..5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport, Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 ....7.525
Cleveland J5, R2 ....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 ....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 ....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. I-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ..7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S. Chicago, Ill. U5, W14 .7.525
Sharon, Pa. S3 .....7.525
Sparrows Point (36) B2 ..7.525
Warren, O. R2 .....7.525
Weirton, W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky (8) A10 ...5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Alabama City, Ala. R2 ..6.275
Allenport, Pa. P7 .....6.275
Aliquippa, Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W.Va. F4 ...6.275
Fontana, Calif. K1 ....7.40
Gary, Ind. U5 .....6.275
Granite City, Ill. G4 .....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2 ..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 ....6.275
Sparrows Point, Md. B2 .6.275
Steubenville, O. W10 ...6.275
Warren, O. R2 .....6.275
Weirton, W.Va. W6 ....6.275
Yorkville, O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 ....9.275
Cleveland J5, R2 ....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana, Calif. K1 ....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (37) B2 ..9.275
Pittsburgh J5 .....9.275
Sparrows Point (38) B2..9.275
Warren, O. R2 .....9.275
Weirton, W.Va. W6 ...9.275
Youngstown Y1 ..... 9.275

SHEETS, Culvert

	Cu	Cu Steel	Fe
Ala. City, Ala.	R2	7.225	....
Ashland, Ky.	A10	7.225	7.475
Canton, O.	R2	7.225	7.75
Fairfield	T2	7.225	7.475
Gary, Ind.	U5	7.225	7.475
Granite City, Ill.	G4	7.325	....
Ind. Harbor	I-2	7.225	7.475
Irvin, Pa.	U5	7.225	7.475
Kokomo, Ind.	C16	7.325	....
Martins Fry.	W10	7.225	7.475
Pitts., Calif.	C11	7.975	....
Pittsburgh	J5	7.225	....
Sparrows Pt.	B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

Alabama City, Ala. R2 .6.875‡
Ashland, Ky. A10 ...6.875†
Canton, O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 ...6.875†
Gary, Ind. U5 .....6.875†
Granite City, Ill. G4 ...6.975*
Ind. Harbor, Ind. I-2 ..6.875†
Irvin, Pa. U5 .....6.875†
Kokomo, Ind. C16 ....6.975‡
Martins Ferry, O. W10 6.875*
Middletown, O. A10 ...6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
Sparrows Pt., Md. B2 ..6.875†
Warren, O. R2 .....6.875†
Weirton, W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
Sparrows Pt. (39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.275
Irvin, Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland, Ky. A10 ....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland (28) B2 .....7.65
Niles, O. (28) R2 .....7.65
Weirton, W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland, Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 ....6.775
Gary, Ind. U5 .....6.775
Granite City, Ill. G4 ....6.875
Ind. Harbor, Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover, O. E6 .....8.70
Follansbee, W. Va. F4 ...8.70
Ind. Harbor, Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Beech Bottom, W. Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown, O. A10 ....7.225
Niles, O. M21, S3 ....7.225
Warren, O. R2 .....7.225
Weirton, W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co. Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel Div., U. S. Steel Corp.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Josiyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K3 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman & Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S. & W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 PacificStates Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.,
P5 Pilgrin Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1 .5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. F4 ..7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5..7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 .....7.425
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 ..7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41, Y1 ..7.425

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	....	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	18.85	22.95	27.80
Buffalo W13	...	18.85	....	....
Fostoria,O. S1	...	19.05	22.15	....
FranklinPark,Ill. T6	...	19.20	23.30	28.15
Harrison,N.J. C18	...	18.85	22.95	27.80
NewYork W3	...	18.85	22.95	27.80
Palmer,Mass. W12	...	18.85	....	....
Trenton,N.J. R5	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	18.85	22.95	27.80
Youngstown S41	...	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
IndianaHarbor Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 .....8.30
Ind.Harbor,Ind. I-2, Y1.8.20
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)	T-72	T-65	T-58	T-52
Fully Processed (Semiprocessed ½c lower)				
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
Muncie Ind. I-7 .....8.00
N.Tonawanda,N.Y. B11 .8.00
Palmer,Mass. W12 ....8.30
Pittsburg Calif. C11 ...8.95
Portsmouth,O. P12 .....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.10
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie Ind. I-7 .....13.60
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....13.70
Pittsburg Calif. C11 ..13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.05
Palmer,Mass. W2 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7,J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 .....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill A7	173
KansasCity, Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt. Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) To Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
Sparrows Pt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
PittsburgCalif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt. Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	21
Crawfordsville,Ind. M8	2.14
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	.9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	.9.10	9.775§
Bartonville(48) K4	.9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80†‡
Donora,Pa. A7	.9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	.9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80†‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	.9.25	9.80**
Kokomo(48) S16	.9.10	9.65†
LosAngeles B3	.9.95	10.625§
Monessen(48) P7	.8.65	9.35§
Palmer,Mass. W12	.9.30	9.85†
Pitts.,Calif. C11	.9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	.9.00	9.55**
S.SanFran. C10	.9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70†§
Struthers,O. Y1	.9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. †Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and sherter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread)& Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer length	35.0

Lag, Plow, Tap, Blank Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam	34.0

NUTS
(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+ 19.0
¾, ⅞, and 1 in.	+ 39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+ 85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+ 29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.40	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	....	43.40	55.40	73.00	....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St. Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅝ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company, Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base Cold Rolled 10%	Strip, Carbon Base Cold Rolled Both Sides
Copper*	$36.20	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	W Hot Wk. (H-21)	1.425-1.44
Oil Hardening (O-1)	0.505	V-Cr Hot Work (H-13)	0.550
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa., P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa. deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Troy,N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.12	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53#	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.00	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.25	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.80	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill. Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St., Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt., Matilda, Pa., Portsmouth, Ohio. Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif. $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$10.75-11.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty, †Nominal.

Manganese Ore

Mn 46-48%, Indian 91.5c-96.5c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	29.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe:	
Minimum trucklots, freight allowed east of Mississippi River:	
100 mesh, 100 lb bags	11.25
100 mesh, 100 lb pails	9.10§
40 mesh, 100 lb bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum, freight allowed	
Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.50-51.00†
Bronze, 5000-lb lots	52.40-56.40†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	53.00-57.30†
Phosphor-Copper, 5000-lb lots	64.80
Copper (atomized) 5000-lb lots	45.30
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom.**
1000 lb	2.80
Less 1000 lb	2.95
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

—Inches— Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearney, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.40	$5.40	$5.30	$5.75
Bar Size Angles	5.10	5.10	5.00	5.43
Structural Angles	5.10	5.10	4.90	5.43
I-Beams	5.11	5.11	5.01	5.45
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.20	6.15	6.05	6.51
Sheets, H.R.	8.30	8.30	8.30	8.60
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.76	25.64	25.64	26.51
Barbed Wire (†)	6.55	6.55	6.55	6.90
Merchant Bars	...	...	5.20	5.65
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.19	5.32	5.14	5.49
Wire Rods, O.H. Cold Heading Quality No. 5	5.09	6.22	6.04	6.34
Bright Common Wire Nails (§)	7.65	7.65	7.65	7.95

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	15.50

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices. 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c, less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload bulk 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices. **65% Ferrosilicon:** Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-11% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, caload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb. f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

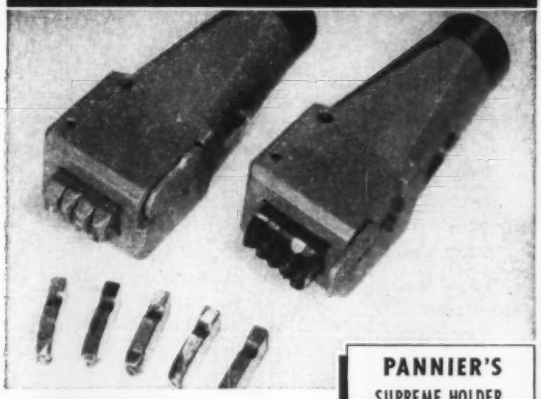
Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosporus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo., in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

ANOTHER *PANNIER* MASTER MARKER!



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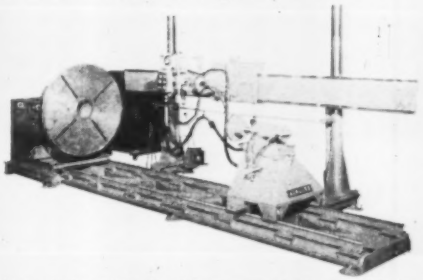

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Scrap Price Composite Declines

STEEL's composite on No. 1 heavy melting drops 66 cents to $33.67, lowest since May of last year. No improvement is expected until conclusion of labor contract negotiations

Scrap Prices, Page 218

• **Pittsburgh** — Prices on most grades of scrap here have declined in a dull market. Brokers see little chance for improvement until the steel labor situation is clarified. Facing a possible strike on July 1, mills are working off their inventories and trying to conserve cash. A local purchaser is buying small tonnages of No. 1 heavy melting at $35. Brokers for a mill on the fringe of the district are offering dealers only $34, delivered, for that type material.

• **Chicago** — The scrap market is static as far as steelmaking grades are concerned, although local steelmaking operations are at 95.5 per cent of capacity. Buying is negligible. To sustain operations, mills are depending essentially on hot metal from blast furnaces, industrial scrap returned by steel consumers under special arrangement, and revert scrap.

Cast scrap prices are firmer as demand from gray iron foundries improves. Some grades are up $1 a ton.

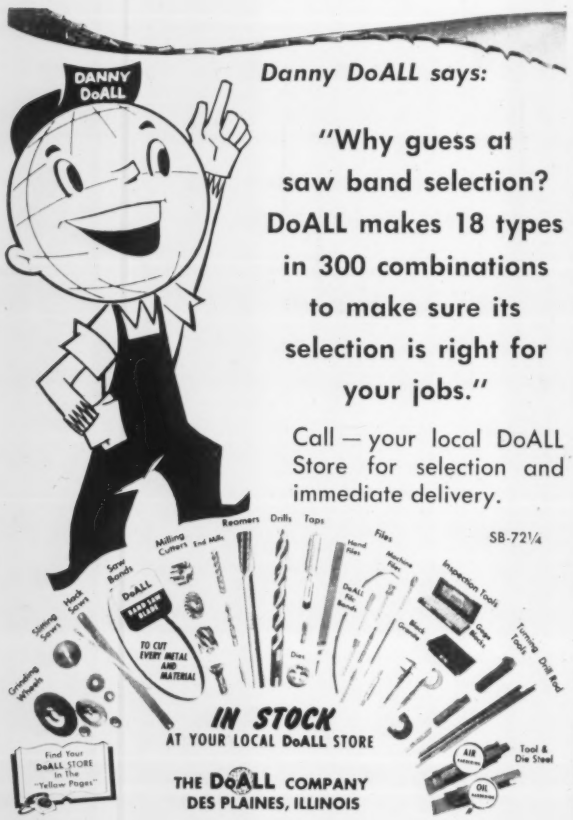
• **New York**—Scrap trading continues quiet. Domestic demand is spotty. A couple of ships are being loaded here for export, but no new business is noted from foreign buyers. Prices are easy with brokers' offerings off $2 a ton on No. 2 bundles at $15-$16. Prices on all other grades are unchanged.

• **Philadelphia** — Scrap prices are relatively steady here, primarily because there is so little business. Exporters are taking a little tonnage, but not enough to offset the lag in domestic demand. Consensus in the trade is that there will be little change in the market into the third quarter.

• **Youngstown**—A sale of No. 2 bundles at $24 a gross ton and No. 1 heavy melting industrial scrap at $39 here indicate the weak demand for scrap. U. S. Steel Corp., which had been charging up to 80 per cent hot metal in its 14 open hearths, with 8 hour heats, had a blast furnace break-out. This knocks out the furnace for a week or ten days and will force more scrap use. Dealers here see little likelihood of any pickup in demand or price until after the new steel pact is made.

• **Buffalo** — Dealers expect steel mills to place new orders for scrap around prevailing price levels for May delivery. Dealers feel that the market may become slower, but prices aren't expected to go much lower right away.

Dealers are moving as much scrap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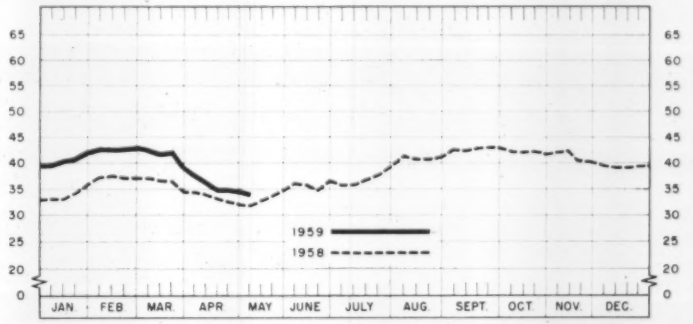
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.



May 6 1959	Week Ago	Month Ago	Year Ago	Apr. Avg.
$33.67	$34.33	$36.17	$32.00	$34.96

as possible against current orders. Mills also appear anxious to take in material as fast as it becomes available. When the last steel strike was called here, hundreds of cars of scrap were still en route to mills, presenting a handling problem.

• **Detroit**—The undertone of the local market is soft, but the absence of orders has kept prices from slipping lower for the moment. Dealers think some long term Canadian orders have kept a floor under the market and expect to see this collapse by May 15. Chances are prices will slide off at least $1.

The market for turnings is soft, with dealers refusing to pay more than $8 a gross ton. Cast iron grades have held up reasonably well. One order for cupola cast is reported at $44, delivered.

• **Cincinnati** — Area mills entered the market for May requirements, and prices tumbled another $1 to $2.50 a ton on principal steelmaking grades. A local mill is buying small tonnages as an inventory precaution.

• **St. Louis**—Scrapyard receipts are short. With mill buying limited, the market is quiet. But the price slide has halted, at least temporarily. Machine shop and short shovel turnings are listed at nominal prices.

• **Birmingham** — Brokers continue to have trouble filling orders at present prices. Dealers are accepting orders as long as new scrap lasts, but only trickles are being brought in. They refuse to sell from inventories at present prices.

A railroad list closed last week offered rerolling rails at $56.30 on line, $3.30 more than last quotations. But no takers were found in the district.

(*Please turn to Page 223*)

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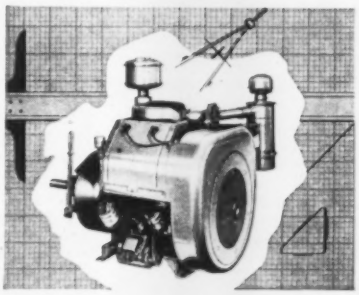

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, May 6, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 6	$33.67
Apr. 29	34.33
Apr. Avg.	34.96
May 1958	33.21
May 1954	28.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	32.00-33.00
No. 1 dealer bundles	38.00-39.00
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*34.00-35.00*
No. 1 factory bundles	42.00-43.00
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Cut structurals:	
2 ft and under	*43.00-44.00*
3 ft lengths	*42.00-43.00*
Heavy turnings	*30.00-31.00*
Punchings & plate scrap	*43.00-44.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	46.00-47.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
Rails, 2 ft and under	*54.00-55.00*
Rails, 18 in. and under	*55.00-56.00*
Random rails	*50.00-51.00*
Railroad specialties	*44.00-45.00*
Angles, splice bars	51.00-52.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	34.00-35.00
No. 1 hvy melt., dealer	31.00-32.00
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	37.00-38.00
No. 1 dealer bundles	*32.00-33.00*
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	34.00-35.00
No. 1 busheling, dealer	31.00-32.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	40.00-41.00
Punchings & plate scrap	41.00-42.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	*43.00-44.00*
Unstripped motor blocks	*38.00-39.00*
Clean auto cast	*53.00-54.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	53.00-54.00
Angles, splice bars	*46.00-47.00*
Axles	*61.00-62.00*
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	115.00-120.00
430 bundles & solids	120.00-125.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	26.00-27.00
No. 1 busheling	35.00-36.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos	38.00-39.00
Electric furnace bundles	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	24.00-25.00
No. 1 factory bundles	37.00-38.00
No. 1 bundles	33.00-34.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	35.00-36.00
Cut structurals, plates 2 ft and under	42.00-43.00
Low phos, punchings & plate	34.50-35.50
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	34.50-35.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	33.00-34.00
Brake shoes	36.00-37.00
Clean auto cast	50.00-51.00
Burnt cast	37.00-38.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
Railroad specialties	48.00-49.00
Uncut tires	42.00-43.00
Angles, splice bars	51.00-52.00
Rails, rerolling	58.00-59.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-125.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	23.00
No. 1 busheling	37.00
Machine shop turnings	16.00†
Short shovel turnings	18.00†

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	42.00
Heavy breakable cast	40.00
Unstripped motor blocks	41.00
Clean auto cast	50.00
Stove plate	45.50

Railroad Scrap

No. 1 R.R. heavy melt.	38.00
Rails, 18 in. and under	49.00
Rails, random lengths	42.50
Rails rerolling	54.00†
Angles, splice bars	44.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	21.00-22.00
No. 1 busheling	30.00-31.00
Cast iron borings	14.00-15.00
Machine shop turnings	22.00-23.00
Short shovel turnings	23.00-24.00
Bars, crops and plates	40.00-41.00
Structurals & plates	39.00-40.00
Electric furnace bundles	36.00-37.00
Electric furnace:	
2 ft and under	34.00-35.00
3 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	52.00-53.00
Rails, random lengths	41.00-42.00
Angles, splice bars	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling	35.00-36.00
Electric furnace bundles	38.00-39.00
Mixed borings, turnings	20.00†
Short shovel turnings	23.00-24.00
Machine shop turnings	19.00†
Heavy turnings	32.00-33.00
Structurals & plate	40.00-42.00
Couplers, springs, wheels	42.00-43.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Drop broken machinery	49.00-50.00
Malleable	67.00-68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	26.00-27.00
No. 2 bundles	*15.00-16.00*
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00
Short shovel turnings	13.00-14.00
Low phos. (structurals & plates)	35.00-36.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	24.00-25.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	32.00-33.00
No. 2 bundles	22.00-23.00
No. 1 busheling	32.00-33.00
Mixed borings, turnings	19.00-20.00
Machine shop turnings	17.00-18.00
Short shovel turnings	21.00-22.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*31.50-32.50*
No. 2 heavy melting	*26.50-27.50*
No. 1 bundles	*31.50-32.50*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*31.50-32.50*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	17.00-18.00
Cast iron borings	16.50-17.50
Low phos., 18 in.	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	43.00-45.00
Heavy breakable cast	39.00-40.00
Charging box cast	38.00-39.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	*53.00-54.00*
Rails, random lengths	*46.00-47.00*

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00
No. 2 bundles	*20.00*
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	41.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	8.00-9.00
Short shovel turnings	*10.00-11.00*
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	17.00-18.00
No. 1 bundles	28.00-29.00
No. 2 bundles	16.00-17.00
No. 1 busheling	26.00-27.00
Machine shop turnings	*9.00-10.00*
Mixed borings, turnings	10.00-11.00
Short shovel turnings	*10.00-11.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	30.00-31.00
Charging box cast	31.00-32.00
Heavy breakable	31.00-32.00
Unstripped motor blocks	19.00-20.00
Clean auto cast	43.00-44.00

SEATTLE

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*33.00*
No. 1 bundles	29.00†
No. 2 bundles	*23.00*
Machine shop turnings	17.00
Mixed borings, turnings	17.00
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	34.00
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	35.00
No. 2 bundles	17.00
Machine shop turnings	15.00
Shoveling turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	49.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	34.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	31.00

HAMILTON, ONT.

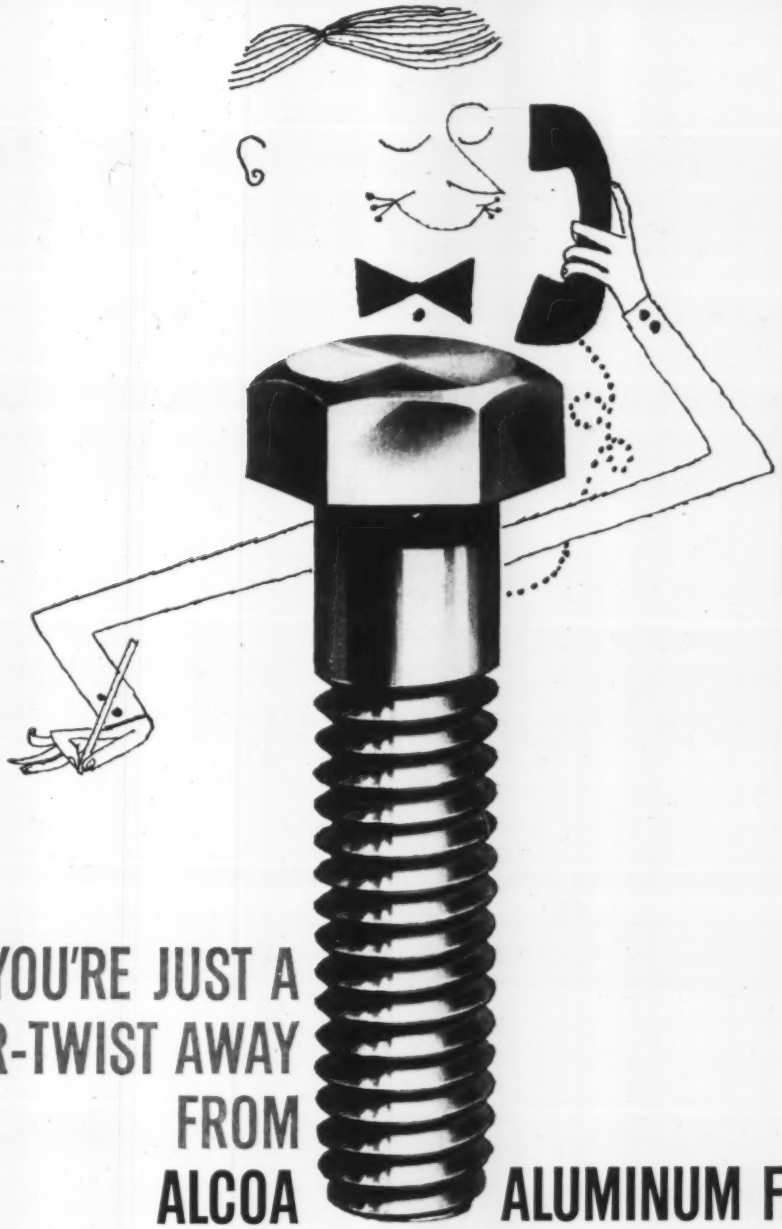
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.



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IF YOU can dial a telephone, you have just about all the "inventory control" you'll ever need to keep you stocked up with Alcoa® Aluminum Fasteners. For, thanks to Alcoa's unmatched distribution facilities, there's a *local* distributor near you with full stocks of Alcoa Fasteners in standard sizes and types . . . to be delivered in a jiffy!

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So don't worry if stocks run short. Look up your local distributor in the Yellow Pages of your phone book. Call him. He'll give your order *action* at the local level almost before you can hang up! *P.S.:* For additional facts and samples of Alcoa Aluminum Fasteners, just mail the coupon below.

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Stability Seen until Midyear

Expect a time of relative calm through June at least as the market settles down to wait for contract talks. Sales should be steady, prices firm. Earnings for quarter better

Nonferrous Metal Prices, Pages 222 & 223

METALMEN AGREE that you can look for a more stable, less hectic market over the rest of the second quarter. They predict: Fewer price changes, continuation of sales at near present levels with perhaps slightly less hedge buying, more market conservatism as contract negotiations draw near.

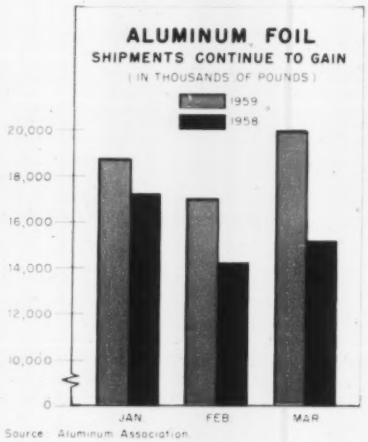
Here's a metal-by-metal rundown on what to expect:

• **Copper**—Primary sales are strong and should remain that way through the quarter. Custom smelter demand is spotty and will probably continue erratic over the next seven weeks. A drying up of demand caused the smelters to lower their price 0.5 cent to 32 cents a pound on Apr. 30. That quotation shouldn't change in the near future. It would take a major market upheaval to bring any change in the primary price.

If the government has any further thoughts about disposing of stockpile copper (see STEEL, Apr. 27, p. 156), it is keeping them quiet. Informed Washington sources say the Office of Civil & Defense Mobilization has quietly canceled its plan although no public announcement will be made to this effect. Reason: It wants to leave the door open to dispose of some of the metal in case of a prolonged strike.

• **Lead-Zinc**—Sales, which are fair, should stay on a plateau for the rest of the quarter. Some observers believe galvanizers will begin to ease up on zinc buying in early June in anticipation of labor difficulties. Everyone would be surprised if the zinc price changed before midyear. Lead, at 11.5 cents a pound, is more vulnerable than zinc, but it looks stable at the moment. You may hear more outcries from Washington for additional remedial help for the industry, but don't look for anything to happen.

Further announcements of production and export curtailments are probable. There have been several of them lately. The most recent comes from American Zinc, Lead & Smelting Co., which will cut back zinc output (beginning July 1) by 6000 to 7000 tons annually, and from the Belgian producer, Katanga, which will reduce zinc exports by 5000 tons yearly, commencing June 1.



Source: Aluminum Association

• **Aluminum**—Shipments are running about 40 per cent over last year's and should continue this pace through the first half. A price change is out of the question until after labor talks which begin Aug. 1. Production is currently running at 1,863,250 tons a year and will remain at this level for the next month or so—then probably go up a little as some new production is brought in.

First Quarter Profits Up

If you needed any clear cut documentation that the nonferrous industry bounced back in the first quarter, profit statements now being released will give you all the proof you need. Take a look at these representative examples:

	1st Qtr 1959	1st Qtr 1958
COPPER		
Kennecott	$22,396,392	$11,651,594
Anaconda	16,250,000	6,130,898
Phelps Dodge	13,000,000	6,800,000
LEAD-ZINC		
St. Joseph	2,060,972	2,424,296
American ZL&S	361,719	165,831
ALUMINUM		
Alcoa	10,725,430	11,458,810
Reynolds	9,001,357	9,910,345
Kaiser	3,476,000	6,419,000
MILLS		
Revere	2,491,375	1,211,562
Bridgeport	2,154,000	565,000
Calumet	1,360,135	396,001

Aluminum is the one nonferrous industry where profits took an across-the-board dip. More aluminum was sold than in the first quarter of 1958 but producers got less revenue per pound due to the price drop that occurred on Apr. 1, 1958. Also contributing to lower earnings was some price weakness in fabricated products and higher labor costs.

NONFERROUS PRICE RECORD

	Price May 6	Last Change		Previous Price	Apr. Avg	Mar. Avg	May, 1958 Avg
Aluminum	24.70	Aug.	1, 1958	24.00	24.700	24.700	24.000
Copper	31.50–32.00	Apr.	30, 1959	31.50–32.50	32.404	32.031	24.433
Lead	11.30	Apr.	20, 1959	10.80	10.992	11.238	11.512
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec.	6, 1956	64.50	74.000	74.000	74.000
Tin	102.50	May	6, 1959	102.75	102.490	103.000	94.510
Zinc	11.00	Feb.	25, 1959	11.50	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig 99.8%, Velasco, Tex.

THE ONES THAT WILL LAST (and last, and last!)?
THOSE MADE OF WEIRKOTE ZINC-COATED STEEL!

Laboratory salt-spray tests prove it. Leading manufacturers prove it. Experience proves it. Primary window frames and storm and screen frames of Weirkote zinc-coated steel last and last and last—literally shrug off the elements!

Weirkote will not give in to corrosion invasion because its zinc coat clings tightly to its steel surface year after year. Reason? Zinc and steel are actually integrated by Weirkote's continuous process.

This extra protection pays off when it comes to fabricating Weirkote, too. You can crimp it, twist it, torture it—work it to the limits of the steel itself—without chipping or flaking its surface. And this pays off in your pocketbook: No more costly rejects, and coating after fabrication can be eliminated.

Whether you're talking profit or product, there's a lot to be said for Weirkote zinc-coated steel. Write today for a free booklet that tells all about it. Weirton Steel Company, Dept. **B-14,** Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.20 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $177 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 31.50 deld.; custom smelters, 32.00; lake, 31.50 deld.; fire refined, 31.25 deld.

Germanium: First reduction, less than 1 kg, 41.00 per gram; 1-10 kg, 37.00 per gram; intrinsic grade, 35.00-37.00 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 nom. per troy oz.

Lead: Common, 11.30; chemical, 11.40; corroding, 11.40, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 100 lb, $11 per lb; 100-500 lb, $9.50 per lb; 500 lb or more, $9 per lb. All prices deld.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $245-249 per 76 lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $2.00-2.20 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.50.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 13.50; No. 2, 14.00; No. 5, 13.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass No. 115, 30.25; tin bronze, No. 225, 41.25; No. 245, 35.00; high-leaded tin bronze, No. 305, 34.50; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 27.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.855; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.50-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	....
0.136-0.096	43.20-48.30	....
0.126-0.103	....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	....
0.077-0.061	....	39.50-40.70
0.068-0.061	44.30-52.20	....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 24.50-25.00; No. 2 heavy copper and wire, 22.50-23.00; light copper, 20.50-21.00; No. 1 composition red brass, 19.00-19.50; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 31.50c)			
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	55.63b	52.86c	....	55.82	27.500	27.500	26.750
Yellow Brass	48.24	32.73d	48.78	51.65	20.625	19.750	18.750
Low Brass, 80%	51.23	51.17	51.77	54.54	23.250	23.000	22.500
Red Brass, 85%	52.29	52.23	52.83	55.60	24.250	24.000	23.500
Com. Bronze, 90%	53.90	53.84	54.44	56.96	25.125	24.875	24.375
Manganese Bronze	56.54	50.14	60.62	....	19.125	18.875	18.375
Muntz Metal	50.85	46.16	....	....	19.375	19.125	18.625
Naval Brass	52.80	46.61	59.36	56.21	19.125	18.875	18.375
Silicon Bronze	60.67	59.86	60.21	78.35	27.000	26.750	26.000
Nickel Silver, 10%	63.82	66.15	66.15	....	25.500	25.250	12.625
Phos. Bronze	75.34	75.84	75.84	77.02	28.625	28.375	25.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 18.00-18.50; new brass clippings, 17.50-18.00; light brass, 13.00-13.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.00-15.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.50-16.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 2.00-2.25; linotype and stereotype, 8.75-9.25; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 26.00-28.00; old sheets, 23.00-25.00; turnings, 20.00-21.00; rods, 26.00-28.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 38.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.00-12.50; mixed high copper clips, 11.00-11.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.75-12.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.75-17.25; segregated high copper clips, 15.75-16.25; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.25-15.75.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 13.50-14.00; mixed high coppel clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.75; light copper, 23.50; refinery brass (60% copper) per dry copper content, 25.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.75; light copper, 23.50; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.20.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 40.50, 2000-5000 lb lots; cast, 43.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; wire, 27.00; No. 2 heavy copper and wire, 26.00; light copper, 23.75; refinery brass deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.30; 2000-5900 lb, 13.30; 6000-11,900 lb, 13.05; 12,000-22,900 lb, 12.80; 23,000 lb or more, 12.30.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 217*)

• **Houston**—The scrap market is listless despite the fact that prices, pegged to a May 15-June 15 mill order, are comparatively high. With the leading mill emphasizing that it likely will buy no more scrap before June 15, brokers are moving slowly in filling their commitments.

• **Seattle**—The principal buyer of scrap in Oregon reportedly has withdrawn temporarily from the market after a period of moderate activity. Combined with lack of new export business, the withdrawal may herald a price change. Current export commitments have been filled.

• **LosAngeles** — Demand for steelmaking scrap remains steady. Mills are buying only for immediate needs; their inventories are high.

CLASSIFIED ADVERTISING

We are interested in purchasing
SURPLUS STEEL and ALUMINUM
Sheet, strip, bars, tubing and pipe
M. R. BERLIN CO.
2900 W. PETERSON ROAD
CHICAGO 45, ILL.

Help Wanted

MECHANICAL ENGINEER
Large manufacturer (approximately 2500 employees) of specialty steel products including closed and open die heavy press forgings, forged and rolled rings and flanges, desires graduate mechanical engineer with 5 to 10 years' experience in tool, die, jig, and fixture design to head this engineering function. Salary commensurate with ability. When applying give educational background, experience and salary requirements. Reply Box 758, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED SHEET PRODUCTION SUPERINTENDENT. Immediate opening for superintendent with background in aluminum strip and sheet rolling. Prefer Mechanical Engineering Degree, or equivalent, with 3-4 years experience. Must have working knowledge of plant layout and auxiliary equipment. Modern installation in growing Mid-southern community. Independent aluminum production. In resume give age, family, references, experience and salary requirement. Enclose photograph. Reply Box 753, STEEL, Penton Bldg., Cleveland 13, Ohio.

Reinforcing steel yard foreman trainee; knowledge of blue print estimating and detailing; age 24-39; write to Rinker Materials Corp., P. O. Box 231, W. Palm Beach, Fla.

Analytical chemist for stainless steel foundry. Must be a graduate with ability to qualify for chief chemist. Equipment includes spectroscope. **Write Box 763, STEEL, Penton Bldg., Cleveland 13, Ohio.**

Representatives Wanted

WANTED: MANUFACTURERS' AGENT for New England territory to represent light hammer closed die forge plant. Please send particulars and lines now represented. Box 760, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

Young Man Desires Position as SALES TRAINEE, Experienced in Tool and Die, Drop Forging, Heat Treating, Machining, and Aircraft. Have worked in Engineering and Administrative Phases. Reply Box 761, STEEL, Penton Bldg., Cleveland 13, Ohio.

INDUSTRIAL ENGINEER—9 years basic metals experience in sheet, strip, rod, tube fabrication including casting, scrap room, and forging operations; thorough knowledge of methods time-study, incentives, cost analysis. Desires responsibility and opportunity with progressive company. Analytical ability; supervisory experience. Age 32. College degree. Reply Box 762, STEEL, Penton Bldg., Cleveland 13, Ohio.

Expanding? Relocating?
FOR **SALE**
Ready To Occupy
Prime
INDUSTRIAL PLANT
CAMDEN, N. J.
28 ACRES
350,000 SQ. FT.
8 MAIN 1-STORY BUILDINGS
Steel & Brick • Unrestricted
plus add'l auxiliary property, including overhead cranes, 10 to 120 tons.
880'Lx133'Wx46'H
800'Lx108'Wx40'H
540'Lx108'Wx40'H
475'Lx 90'Wx33'H
270'Lx 45'Wx50'H
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BUILDINGS FOR SALE

Total of 3-Widths of 58′, 78′, and 31′, length of 600′.2—with crane runways, 1—Capable of handling 80 Ton Crane. Located on siding; ready for dismantling; ideal for heavy industry.

Reply Box 756, STEEL
Penton Bldg., Cleveland 13, Ohio

I am looking for a manufacturing company interested in purchasing a newly invented machine for the production of spiral-welded metal pipes of different lengths, diameters, and strength at reduced cost.

Please contact Mathias Dupont, 2 rue du moulin Moyeuvre-Grand, Moselle, France.

Want to strip "unstrippable" coating?

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

Even tough EPOXY FINISHES peel off in Oakite STRIPPER S-A

Burn off an epoxy finish from a reject as a last resort? Not at all necessary. Oakite STRIPPER S-A strips metals clean. That's true for multiple coats as well as single coat epoxy finishes. Look at STRIPPER S-A's record:

- *A 3/16" thick coating built up from layers of epoxy coating and wrappings of fiber glass was stripped from gun barrels by overnight soak in Stripper S-A. Everything tried previously had failed.*
- *Brass plated steel parts were stripped of their epoxy finish in matter of minutes.*
- *Workholding spindles and racks laden with at least 10 coats were stripped to bare metal by a short soak. Paint hooks formerly burned clean are now soaked clean instead.*

This powerful stripper is safe for all metals except zinc and magnesium. And it's safe to the user, since it works cold . . . has no flash point . . . rinses with water.

STRIPPER S-A is but one of a long list of superior strippers by Oakite. Some are specially formulated for use on steel . . . aluminum . . . other metals. Some for removing lacquers . . . tough synthetic finishes. Still others are designed especially for removing paint from vertical surfaces. Whatever your paint-stripping problem—Oakite is bound to have the answer. Ask your local Oakite man or send for paint-stripping bulletin F-7893. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

50 *1909-1959* SCIENCE *years' leadership in industrial cleaning*

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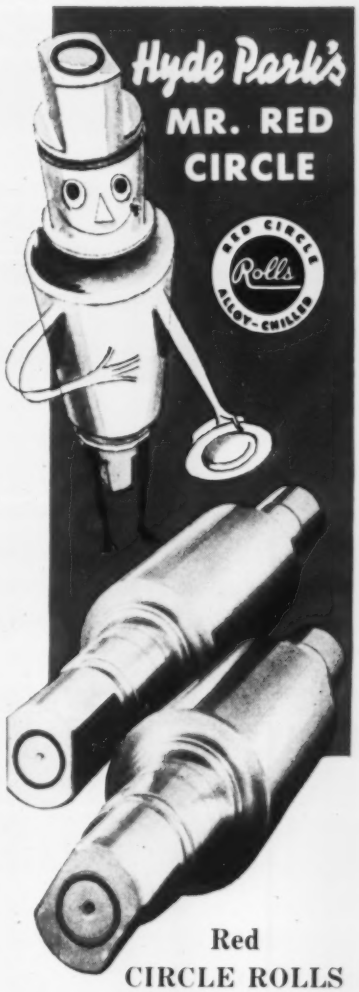

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CIRCLE ROLLS
for every purpose

Uniform performance, high production and long service are unfailing characteristics of these better rolls.

Preferred by leading mills throughout the nation for more than half a century.

Yes, there's a Red Circle Roll for every purpose.

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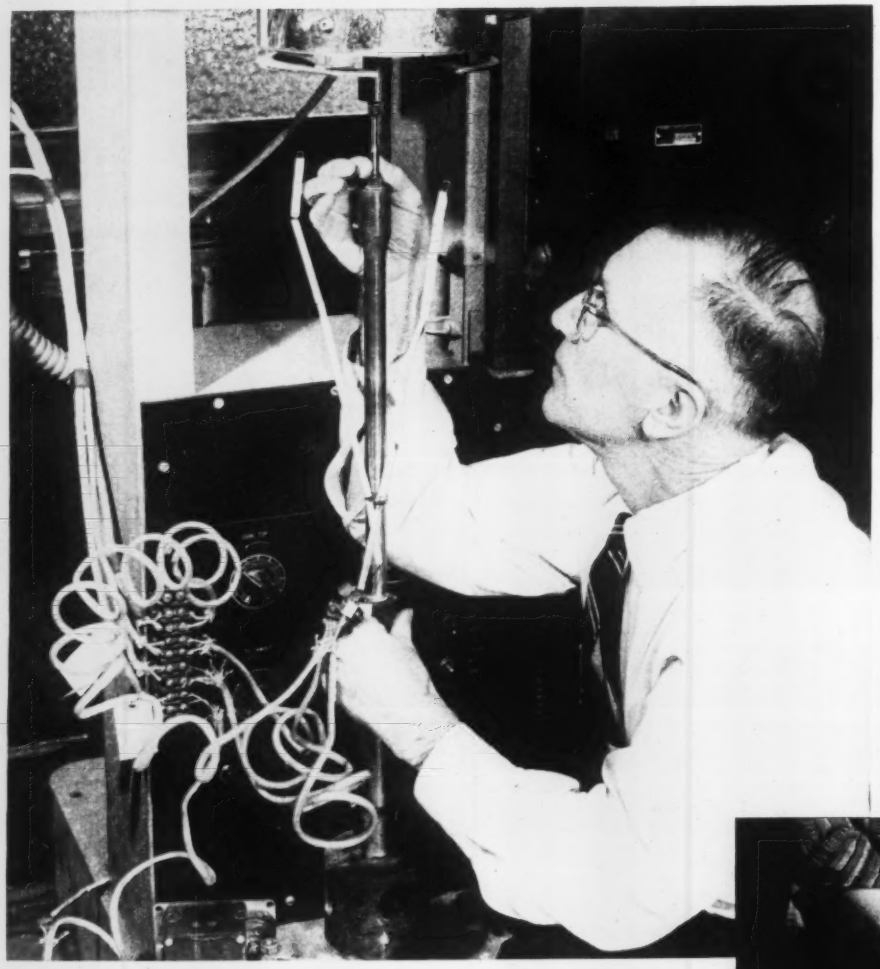
HYDE PARK
Westmoreland County, Pa.

Rolls
Rolling Mill Equipment
Gray Iron Castings



Physical tests at Standard include those for special properties of steel alloys under extreme variations in temperature. Here, the strength and ductility of steel are being checked for resistance to stress under severe conditions of elevated temperatures over a prolonged period of time.

Charpy impact and transition temperature determinations have recently assumed importance in many applications. Here a steel sample is immersed in liquid nitrogen to determine its susceptibility to fracture at temperatures as low as −300°F.

Quality control—a vital activity at Standard Steel Works

Every conceivable shop and laboratory test required for modern quality control can be performed by Standard's staff of metallurgical technicians. Testing of incoming raw materials; physical property tests of steel and other alloys at temperatures from several hundred degrees below zero up to red heat; gas analysis, ultrasonic, X ray, magnetic particle, fluorescent penetrant and microscopic examination of finished products are routine checks which assure that the finished, delivered product will meet the most rigid specifications. Write Department 2-E for full details.

Standard Steel Works Division

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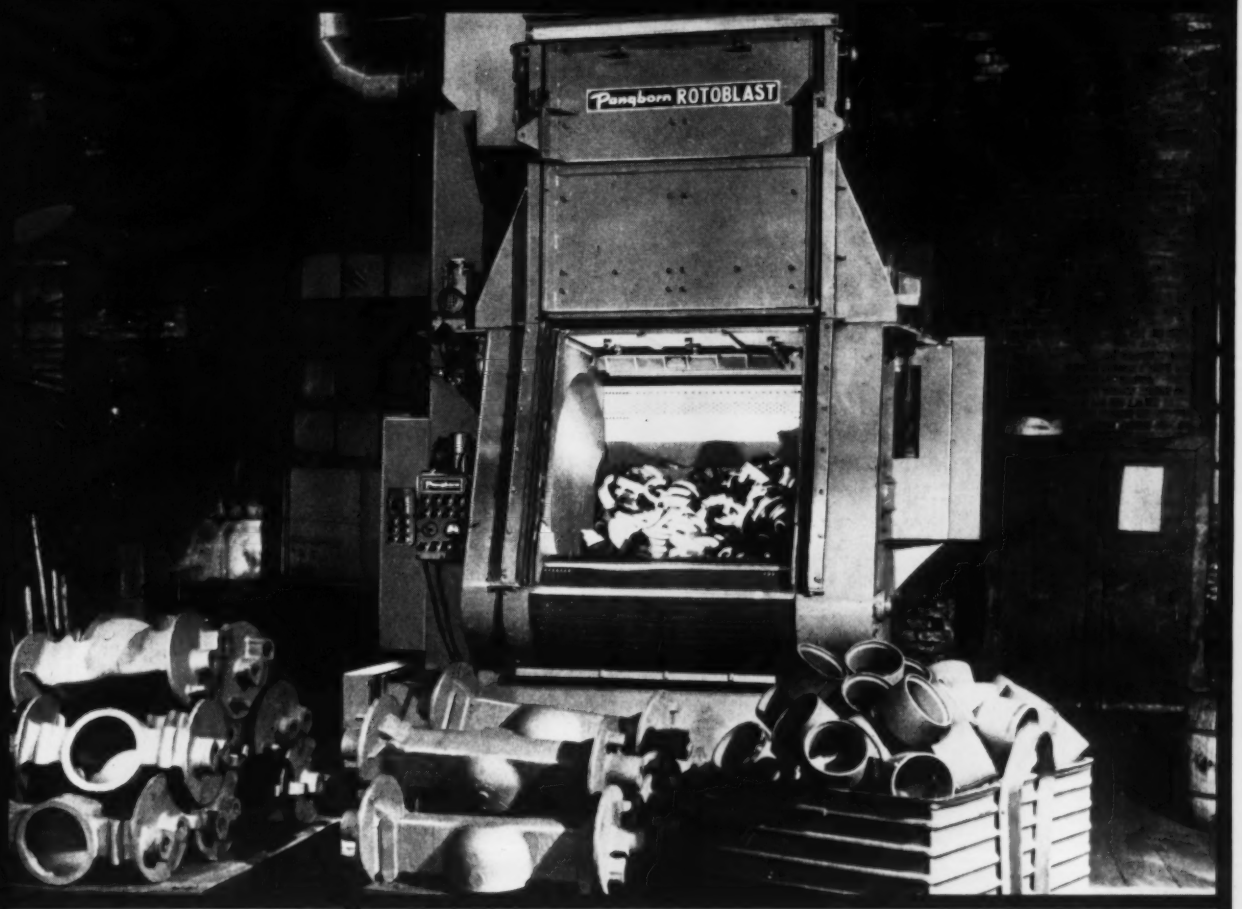
BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

CUTS MAN-HOURS 38%



Pangborn Rotoblast cuts man-hours per day from 24 to 15 at Meadville Malleable Iron

The investment in a new 20 cu. ft. Pangborn Rotoblast Barrel has really paid off for Meadville Malleable Iron Co., Meadville, Pa.! By switching from a competitive barrel of about 12 cu. ft. capacity, the firm now cleans loads three times as large in half the time. Today tote box loads averaging 1900 lbs. each are cleaned in 4-5 minute cleaning cycles. As a result, the Rotoblast Barrel has cut 24 man-hours per day to 15 man-hours in the cleaning department and greatly improved the quality of the work.

How much time and money can Pangborn Rotoblast save you? It would pay you to talk to the Pangborn man in your area. Or write PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment and Rotoblast Steel Shot and Grit.*

Pangborn

CLEANS IT FAST WITH ROTOBLAST®

FROM START TO FINISH IN HANDLING STEEL

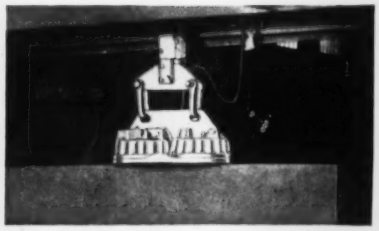
From scrap yard to finished product, the modern efficient way to handle metals is with a Cutler-Hammer Supermagnet . . . the first name in lifting magnets for more than fifty years!

SPECIAL PURPOSE MAGNETS

Designed for specific applications, Cutler-Hammer Magnets can substantially reduce handling costs. As shown in the main illustration, Cutler-Hammer Rail Handling Magnets move multiple rails swiftly, efficiently, and safely.

BI-POLAR MAGNETS

These Cutler-Hammer Magnets are designed specifically for handling structural shapes such as I beams, angles, and channels. Cutler-Hammer Bi-Polar Magnets have played a major role in cutting the cost of classifying and stacking beams for shipment.

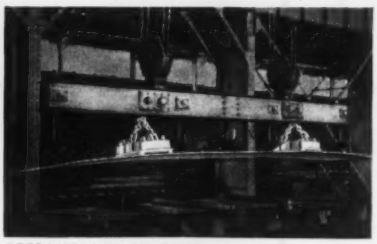


DUPLEX MAGNETS

This custom-built duplex magnet for slab turning in a scarfing department is a good demonstration of Cutler-Hammer's ability to design and build magnets for even the most varied and specialized applications.

CIRCULAR MAGNETS

Cutler-Hammer Supermagnets are known the world-over for their versatility, durability, and dependability. Perfect for handling iron or steel in any form, hot or cold, and in all kinds of weather. Available in either welded or bolted construction, sizes ranging from 39" to 77".



RECTANGULAR MAGNETS

Cutler-Hammer Rectangular Magnets provide maximum lifting capacities with minimum magnet weight . . . also save in crane equipment and daily power consumption. Perfect for regular shapes such as sheet and bar stock, etc. Heavy duty rectangular magnets recommended for handling billets, ingots and slabs.

CUTLER-HAMMER
CONTROL
C-H

To solve your metal handling problem, look to Cutler-Hammer where you are assured not only the finest magnet on the market today, but the magnet that's perfect for your needs. Write today, Dept. J213. Cutler-Hammer Inc., Milwaukee 1, Wis.

Cutler-Hammer Inc., Milwaukee, Wis. • *Division:* **Airborne Instruments Laboratory.** • *Subsidiary:* **Cutler-Hammer International, C. A.**

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation.